

A Sinusoidal Manual

By

T. C. Cornell, M. D.



SOME OF OUR LEADERS

No. 8400 Hogan Super-Power High Frequency Apparatus —

Offering a wide range of high frequency currents for Diathermy, Auto-Condensation, Electro-Coagulation, Tesla Vacuum Electrode Treatment, Oudin Cold Spray, Desiccation, etc. Ask for complete description.

No. 8000 Hogan High Frequency Apparatus —

Affording d'Arsonval, Tesla and Oudin Currents, suitable for general Electro-Therapeutic work with high frequency currents where the heaviest currents are not required. Literature sent upon request.

McIntosh Carpenter Vibrator —

The most scientific vibratory apparatus on the market; affords the direct percussion stroke. Ask for Bulletin on Mechanical Vibratory and Concussion Apparatus.

McIntosh Galvanic, Faradic and Sinusoidal Electrodes —

Most complete line of electrodes for administration of Galvanic, Faradic and Sinusoidal Currents manufactured by any firm. Electrodes adaptable to practically any purpose. Ask for special Electrode Bulletin.

Hogan Silent Universal 2 K. W. Roentgen Transformer —

Combining High Frequency Apparatus, affording Tesla and d'Arsonval Currents; adapted to operate Coolidge Radiator Type Tube. Ask for complete literature.

McIntosh Physical Therapy Apparatus Bulletin

Describing our complete line of apparatus, sent upon request.

A Sinusoidal Manual

by

T. C. Cornell, M. D.

*Formerly Captain C. A. M. C. (C. E. F.)
Vocational Medical Officer, D. S. C. R. Canada
Asst. Supt. Sask. Prov. Hosp. Canada*



Published by

McIntosh Electrical Corporation

223-233 N. California Ave. Chicago, Ill.

Copyright by the
McIntosh Electrical Corporation,
Chicago—January, 1924

AN ELECTRO-PHYSIOTHERAPY CHART

Prepared by Charles L. Ireland, M. D., Columbus, Ohio

Vertebral Reflexes which may be Elicited by Stimulation

The busy physician utilizing physiotherapy in his practice will find this chart to be a wonderful aid in refreshing the memory regarding the technique of the various modalities. The following are a few of the subjects covered by this chart:

1. Diagram of different varieties of electricity.
2. Nerve centers of the sympathetic nervous system which may be evoked by concussion or sinusoidalization.
3. Muscular reflexes which may be excited by electrical stimulation of various forms.
4. Motor points for electro-diagnosis.
5. Indications for the application of light therapy.
6. Nerve centers of the autonomic nervous system as an aid in spondylodiagnosis.
7. Table of technique for treatment of various conditions with Sinusoidal current.
8. A special diagram showing the muscles of the face and scalp and the motor points for electro-stimulation.

ELECTRO-PHYSIOTHERAPY CHART

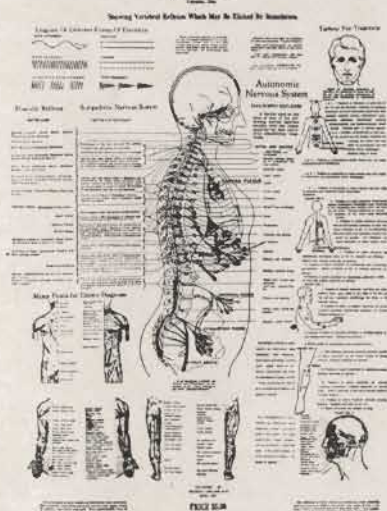


Fig. 10,010—Code word Grand.
Price \$3.50. Class F.

This chart is handsomely printed upon heavy paper, 20 inches wide, by 31 inches long, with metal bound edges to hang upon the wall where it is always ready for reference.

Publishers' Note

DOCTOR T. C. Cornell, the author of this "Sinusoidal Manual," has been fortunate in having opportunities for a wider experience in the application of Physical-Therapy in institutional and military work than ordinarily falls to the lot of one medical man in a thousand.

As Adjutant to the Chief of Staff and Electro-Therapy Clinician of the largest military hospital in the world at Epsom, England, he had an unusual opportunity of noting the value of Physical Therapy in the treatment of many varied conditions, and his studies based upon such observation will be of immense benefit to every physician.

After being mustered out of active service, he again took an important post with the Canadian Medical Service as Vocational Medical Officer of the Department of Soldiers Civil Re-Establishment, which enabled him to put many of the boys back on their feet with the aid of various Electro-Therapeutic measures.

Following that service, he was appointed as Assistant Superintendent of the Saskatchewan Provincial Hospital, during which service he was able to make some original and unique observations regarding the great benefit to be had in mental and nervous cases when Electro-Therapy is employed intelligently.

The technique he outlines and recommends in this Manual is that which he by actual experience has found most advantageous, and the physician will find that by following Doctor Cornell's suggestions for the application of the currents he will be able to get the greatest possible service and the best results from his Sinusoidal apparatus.

Foreword

It can truly be said that during the World War the Medical Profession was fully awakened to the wonderful possibilities and potentialities of the electric currents through the medium of Physio-Therapy. Until that time the use of the Galvanic and Sinusoidal Currents, in building up metabolism and bringing back to life, as it were, lost nerve function and atrophied and degenerated muscles, was practically ignored by at least 85% of physicians and surgeons.

It was not lethargy nor indifference that caused this attitude, but simply an ignorance and misconception of the fundamental principles of electricity and its chemical and mechanical actions on the human body.

A resumé of the wonders accomplished through its agency is not necessary at this time. Results have spoken for themselves—not only spoken—but have cried out aloud that all may hear.

The pity of it is that even in these days when such definite results are being demonstrated, many, many members of the Medical Profession are still walking in the dark as to the tremendous possibilities within their reach—not only in treating the lame and the halt, but also the diseased.

We, of the Medical Profession, who were unfortunate or fortunate enough to have served in the "Field" and Military Hospitals, during the War, realize the difficulties that beset us in administering Physio-Therapy treatment, due to the lack of proper and adequate apparatus, during the earlier days of the War (this lack of apparatus being due to the tremendous sudden demand).

Possessing the necessary vision, forethought, and medico-electrical-engineering skill, the McIntosh Corporation bent their energies forward, evolved and perfected apparatus to meet every scientific and medical requirement in the Physio and Electro-Therapeutic field today. Being cognizant of the fact that correct and intelligent technique and a knowledge of the fundamental principles of electricity are absolutely necessary to the production of proper and correct results, this little "Manual" is dedicated, not only to those who are already engaged in Electro-Therapeutic Practice but also to the practitioner who is sufficiently progressive and enlightened to make it an adjunct to his practice, whether it be medical or surgical.

No. 1275 WAGGONER'S RESPIRATORY INTERRUPTER



(Patent Applied for)
Fig. 1275

- 1275 Waggoner's Respiratory Interrupter, including 2 Kantbern Electrodes 2x2 inches, 2 Kantbern Electrodes 3x5 inches, 1 single conducting cord, silk, and 1 bifurcated cord, silk, in handsome leatherette case.....\$35.00 Code Sarto

The Respiratory Interrupter is a device which has been designed to promote more scientific method of applying electrical energy to the body. Its function is to interrupt the current in synchronism with respiration in such a manner that the stimulus produced by the descent of the diaphragm occurs at exactly the same moment that the electrical impulse is delivered from the electrical apparatus by means of the switching device of the Respiratory Interrupter.

The value of this device is apparent and most splendid results can be obtained in the treatment of many chronic conditions. It is well adapted to be used in connection with the Polysine Generator.

NOTE:—Insofar as the McIntosh Polysine Generator is equipped with an "interrupted" Sinusoidal current modality, the use of which is indicated in various conditions; the foregoing explanation of the "Respiroidal Current" so termed by Waggoner, demonstrates the increased value of having the current timed in a true physiological manner and thus obtaining perfect therapeutic effects and results.

Treatment—If to restore tone, use the rapid sinusoidal through the Respiratory Interrupter, delivering the respiroidal current comfortably strong. Place one three by five pad over the junction of the 7th and 8th dorsals to catch the two greater splanchnic nerves. Place the other pad first over the lower abdomen on the right side and treat for three minutes, then move the abdominal pad to the left side for three minutes.

Pelvic Floor: If the levator ani muscles are lax, which can be determined by a tendency to protrusion of the anus, or in the female a greater or less degree of prolapse, and if there is no separation of the muscles, as for instance after confinement requiring surgical repair, tone may be produced as follows:

Treatment—Insert in the rectum the largest dilator electrode that can be comfortably borne and place a three by five pad over the lower abdomen. Apply the Respiratory Interrupter and deliver a comfortably strong respiroidal current for five minutes.

If there is actual wasting and atrophy of the muscles of any of the above-mentioned walls, the slow sinusoidal would be better to build the musculature itself up; however, it is not so good for tonic action. The technique would be just the same, only use the slow sinusoidal current delivered from a good well-known apparatus, setting the waves to correspond as near as possible to the respiration of the patient while lying down.

For best results these treatments should be given daily until definite improvement sets in and then less often.

Do not try to use the slow sinusoidal through the Respiratory Interrupter. It is built for the rapid sinusoidal only.

GALVANISM

Thanks to the great advances made during the past few years in Electro-Therapeutic Apparatus, research work and consequent present-day highly efficient modes and methods, the physician of this age, when using the Galvanic Current, is not troubled with the constant care of several unwieldy batteries, renewal of chemicals, etc., or weakening of the current when most needed.

With the apparatus now at his command, he merely turns the switch and immediately has a current which is under complete control, weak or strong as required, constant or interrupted, or combined with the sinusoidal—all obtained by the mere turning of a small handle to the modality desired.

We will now briefly discuss what the Galvanic Current is, its physiological actions, etc.

The Galvanic Current is a constant or direct current, that is, it flows in one direction only. It possesses a Positive and a Negative pole (Polarity) and the current flows from the Positive to the Negative. This point is important to remember when giving treatment. When applied to the human body, its action is chemical (Cataphoresis).

First, we must take into consideration that the human body is practically a sac, containing fluids which hold various salts in solution, the chief of which we will assume to be Sodium Chloride.

The Galvanic Current, owing to its chemical action, splits up these salts into their various constituents, the metallic portion being attracted to the Negative Pole and the acid portion being attracted to the Positive Pole.

This redistribution is obviously of great value in the increase of tissue changes and is summed up in the word "Metabolism." Fatigue products such as Carbonic Acid, etc., which result from excessive muscle activity, are thrust on their way, out of the muscles, toward the Pole, and so more readily eliminated. This is what we call the "Refreshing" action of the current.

In addition to its chemical effects, the Galvanic Current is of great value when used in connection with ionic medication, that is, introducing drugs into the tissues.

Knowing that the Positive Pole attracts Acids and repels metals, it will, therefore, be quite clear that if we wish to introduce a metal into the tissues, we must use the Positive Pole—if we wish to draw acids from the tissues, then we must use the Positive Pole. To sum up:

- 1—The Positive Pole is the Acid Pole and is a Vaso-Constrictor, and, therefore, assists in stopping Hemorrhage.
- 2—Contracts and hardens tissue.
- 3—Has a sedative effect.
- 4—Decreases active inflammation.
- 5—Dries or dehydrates tissue.
- 6—Iron, Zinc, Copper and other metals are applied at this pole.

- 1—The Negative Pole is Alkaline.
- 2—Is a Vaso-Dilator and, therefore, increases Hemorrhage.
- 3—Relaxes and softens tissue.
- 4—Is irritant in character.
- 5—Increases inflammation and moisture.

This pole is also used for introduction of acids into the tissues in ionic medication, also halogens such as Iodin and Chlorine.

In administering treatments with the Galvanic Current, it is very important to be quite certain as to which is the positive pole and which is the negative pole, owing to the fact that each pole, when applied in treatment, produces a

widely different effect, both chemically and physiologically. The simplest and easiest tests for "polarity" are as follows:

Take a basin or glass of water and place the two cords, to which are attached metal electrodes, into the water. See that they are not touching each other, but at the same time, are fairly close together. Turn on the current slowly and in a short time it will be noticed that one of the electrodes is covered and surrounded with tiny bubbles of gas—this is Hydrogen, which is freed at the negative pole. If the current is allowed to flow some time longer, bubbles will be noticed at the positive pole, but not to the same extent as at the negative pole. Thus, we know that a chemical reaction has taken place, in that the water has been split up by the current, into its two constituents, H. and O., in the proportion of H_2O . This result is called, "Electrolysis."

The next test is by means of litmus paper. As we already know, blue litmus paper turns red to acid reaction and red litmus paper turns blue to alkaline reaction. Therefore, take a piece of moistened litmus paper, place the positive and negative electrodes upon it and turn on the current. If blue litmus paper is being used, you will notice that it turns red at the positive pole. If red litmus paper is being used, it will turn blue at the negative pole.

Another test which can be carried out is made by moistening a piece of white blotting paper with a saturated solution of Potassium Iodide; place the tips of both conducting cords on the moistened area about an inch apart and turn on a mild current. Immediately a brown stain will appear at one pole, indicating the presence of free Iodine which is attracted to the Positive Pole.

In determining specifically indications for polarity applications, first find out whether your patient requires sedation or relief of pain, or whether he requires stimulation.

It will be understood from the foregoing explanation of the chemical action of the Galvanic Current, that its application is invaluable in the relief of Traumatic Myalgia, Lumbago, Rheumatoid Arthritis of a chronic nature and weaknesses occurring from circulatory stasis and unabsorbed inflammatory products. Stiffened joints, (not Ankylosed). Scar tissue can be successfully and satisfactorily softened by negative applications of one or two per cent Sodium Chloride.

This current being a constant current, therefore, must flow and the point at which the current begins to flow is called the Positive Pole and is denoted by a plus (+) sign. The point at which the flow of current returns is called the Negative Pole and is denoted by a minus (—) sign; hence, the derivation of the positive and negative pole.

The flow of current from "Out" and "Back" is called a "Circuit." A circuit is said to be "Closed" when the two poles are connected to any substance or body, allowing the current to pass through.

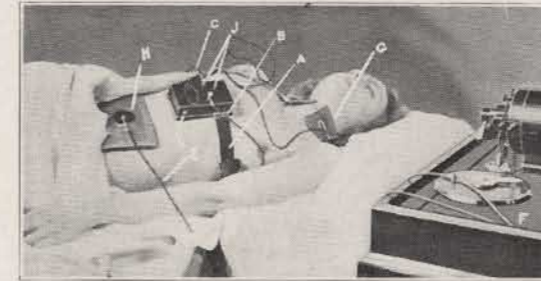
An "Open" or broken circuit is when the current is arrested by disconnecting either pole.

We now go back to the law of magnetism and remember that like poles repel and unlike poles attract. For example: take two pieces of electro magnets; place the north pole of each together and no magnetic condition is discerned. Now, place the north and south pole of each together and we immediately find that they stick together or, in other words, "attract."

We know that all substances, such as drugs, metallic salts, various metals, are made up of ions. An ion is an atom or molecule possessing an unbalanced charge or excess of negative electricity. With the galvanic current we can perform what is known as "ionization;" that is, by its action we break up or disrupt the atoms or molecules into ions and electrons. An electron is the smallest known or extremely minute corpuscle or charge of negative electricity. Thus we see that the galvanic current, owing to its positive and negative polarity is

The Respiratory Interrupter was built upon this basis. It is run by the respiration itself, and delivers the current at the last part of inspiration when compression is the greatest or at the normal time of the tonic discharge; the current mode secured is known as the respiroidal current.

It is a box-like apparatus which straps on the abdomen or chest, wherever expansion is the greatest. It is connected into the circuit along one line coming from any good, smooth, rapid, sinusoidal current. The rapid sinusoidal, delivered by the McIntosh Polysine, is an excellent modality, and is an ideal method to use with the Respiratory Interrupter.



"A" is the strap which is buckled snugly around patient's body at point of greatest expansion. The lever "B" works the mechanism, each time patient breathes. To connect up, run one cord "C" from one terminal of the continuous rapid sinusoidal, to one of the binding posts, "J"; run another cord to one of the electrodes as for instance, "G". A third cord, "E" is then run from the other terminal, "F," of the sinusoidal apparatus directly to the other electrode as "H." The switch "L" is then pushed in, throwing the interrupting mechanism out of the circuit and allowing the current to come directly through. Now deliver the current to the patient by turning it on through the rheostat of your sinusoidal machine (Polysine) until it is comfortably strong. Then throw the interrupter into the circuit by pushing the lever "L" back from the other side of the box. The current will now be automatically interrupted and will be delivered to the two pads "G" and "H" at the last part inspiration.

The respiratory interrupter is indicated in all conditions where the respiroidal current is required—particularly where you are after tonic effects. It is not only indicated in many conditions alone, but is a valuable follow-up to diathermy, galvanism and other forms of electricity.

The Respiratory Interrupter is invaluable in the following conditions:

Diaphragm: One of the most important symptoms of diaphragm insufficiency, is that the patient sighs and complains of inability to fill the lungs. The X-Ray will confirm the diagnosis showing whether it descends wave-like, or piston-like, as it should.

Treatment—Place a three by five pad over the solar plexus, and another over the third, fourth and fifth cervical vertebrae to catch the phrenic nerves. Attach the rapid sinusoidal current to the Respiratory Interrupter, strapped on the abdomen or chest, wherever breathing is best, and deliver an interrupted current through the interrupter, comfortably strong. Treat for five minutes.

Abdominal Walls: Our diagnosis in this case depends upon the character of the abdominal walls. Are they relaxed and puffy?

gasoline engine. In figure (1) you will note that we have drawn the human body on one side and the cylinder, etc., on the other. "A," the diaphragm descends into the abdomen to the point "B," just the same as the piston "A" descends into the cylinder to point "B."

As the diaphragm descends to point C, intra-abdominal pressure is increased, the same as compression of the gas occurs in the cylinder. The effect of this pressure is to produce a pressure or irritation on the fine nerve filaments of the afferent nerves "E" which is carried along these nerves to the solar plexus "F" which is the great receiver, re-organizer and distributor of the sympathetics. Finally as the irritation becomes strong enough it jumps the synapsis of the solar plexus and is delivered out over the efferent system of nerves "E" to the plexii of Auerbach in the musculature and Meisner in the secretory parts to produce tone and function—just the same as the electrical current traveling over the wire "B" is raised to a high enough tension current to jump the contact point of the wire "F" to the spark plug to produce function of the cylinder and piston. The wire "H" is the ground wire to complete the circuit, just the same as the ramifications of the plexii of Auerbach and Meisner complete the circuit of the nervous system.

It is at once apparent that any leak in the abdominal wall (rupture) is going to interfere with normal function, just the same as worn rings of the piston will. It is also apparent that any irritation of any part of the viscera which will produce an excessive or deficient reflex discharge, is going to result in disfunction—just the same as too strong or too weak a spark fails to fire the gas properly.

But the most important point in the gasoline engine, is that the spark must be timed right, i. e., delivered at exactly the right time to produce proper action of the piston. The same thing holds true of the abdomen. Take a painful abdomen, note how the patient breathes jerkily and shallow. The reason is that too strong a reflex is produced, which jumps the synapsis of the nervous system too quickly and excessively, thus "back-firing" and increasing the discomfort. Nature attempts to time it by breathing shallow—while in the gasoline engine we must have a set of timing gears, regulated just right or it back-fires and does not work.

On the other hand if the spark comes too late, the cylinder always works in a very inferior and sluggish way. It is impossible to speed it up. The same thing holds true of the abdomen. If the terminals of the afferent system or the plexii of Auerbach and Meisner have become deadened, we have atony or lack of tone, due to a too weak reflex. These cases are continuously sighing—nature's attempt to produce a stronger and better timed reflex.

Going over the above we can at once see that the ordinary interrupting device, is not going to work to the highest point of efficiency, when we want to use the sinusoidal current for tonic effect, for the simple reason that it is impossible to deliver a properly timed current. First one breath is short and shallow and maybe the next will be long and deep. If, however, we can produce an interrupter run by the respiration itself, then we have an instrument that will automatically interrupt the current when we want it.

capable of producing chemical reactions when applied to the human body, due to the positive or negative effect on the ions comprising the chemical constituents of the tissues, et cetera. The positive pole of the galvanic current is also named the anode, when applied it attracts anions (an anion being an ion having a negative charge). The negative pole of the galvanic current is named the cathode and attracts cations (a cation is an ion having a positive charge).

When using the Galvanic Current it is essential that the patient be properly prepared (in fact this applies when using any current).

See that your patient is placed in a comfortable and suitable position, according to the treatment to be carried out. Have the clothes adequately protected with suitable coverings, such as towels, or thin rubber sheets. Examine the skin carefully for open wounds or abrasions. Wherever the skin is ruptured or absent, the resistance to the current is lowered and thereby allows it (the current) to take this path,—in other words, it bunches up at such a point.

There is thus a possibility of an electrolytic burn. To obviate such an occurrence, have abrasions or any raw surface protected with adhesive or other suitable covering.

The human skin is of very high resistance, therefore it is good technique to thoroughly moisten it with a fairly warm saline solution.

Such procedure lowers the resistance of the skin and increases conductivity. Take care to thoroughly wash off all grease; owing to the fact that grease is practically a non-conductor, it will naturally interfere with passage of the current.

Use pads of fair thickness, and which can be made of material such as absorbent cotton, linen, towelling or felt. I generally use pads ranging from one quarter to three eighths of an inch in thickness.

It is essential that these pads are pliable and easily moulded to any shape or contour and quite absorbent. The pads, of course must be between the skin and metal part constituting the electrode.

All pads should be of fairly large size excepting those which are used on electrode handles when treatment of small areas is being carried out.

Another point—make sure that all pads are in good and smooth contact with the skin. Never allow the pads to come in contact with each other—such a condition would cause a "short circuit" and thus allow the current to pass, as it were, in a circle, instead of through the parts to be treated. There is also a possibility of an electrolytic burn owing to the concentration of the current at one point.

In commencing all treatments, always turn on the current slowly and thus prevent undue discomfort and shocking of the patient.

Always give sufficient current to patient's comfort and no more. Like "endurance," some patients can take much heavier currents than others; it is therefore obvious that the question of any set dosage cannot be laid down, except in special conditions where a very small amount or large amount is indicated.

It is also very important to make sure that all parts under treatment are in condition of relaxation. Then again watch your pads and take care that they do not become dry—keep them moist.

Instruct your patient to tell you of any undue sensation he experiences—never disregard a patient's complaint of discomfort or undue pain—stop the treatment and investigate.

On termination of treatments, always turn off the current slowly and carefully—for reasons as already outlined.

Dry the parts treated and thoroughly examine for undue redness, burns or blisters.

Keep your apparatus clean and dry.

Rinse and treat antiseptically all pads after using. In fact, use the same aseptic measures as you would in any surgical case.

Keep your electrode cords dry—this is not only economy but prevents unnecessary corrosion and therefore renewal.

We have now reached the discussion in regard to the therapeutic uses of the Galvanic current. Before doing so, though, we will lay out briefly the various methods in which the current is applied.

The first method is called the "Uni-Polar" method, which means that only one pole is applied to any certain part when indicated. The pole being used on the affected part is called the "Active" electrode, and the other pole, which is placed at some convenient part to complete the circuit, is called the "Indifferent" electrode.

The second method is called the "Bi-Polar" method, which means that both poles are used in applying the current on any affected area.

The third is named "Stabile" method, which is used when both poles are placed at different points and kept stationary when the current is applied during treatment.

The fourth is called the "Labile" method which is instituted when the "Active" electrode is kept moving about or on and off any area under treatment.

A fact that is often overlooked, and it is surprising how many do overlook this fact, is that the Galvanic current is mainly invaluable in affecting the general metabolism—that is, healing of lesions is hastened—nutrition is improved—and the nerves are toned up.

A very important note to make here, and which it is well to remember constantly, is that the Galvanic current does this work *without* causing any muscular contractions. Muscular contractions only occur when the current is suddenly applied or broken.

Owing to the good effect of the Galvanic current on metabolism, it is, therefore, very beneficial in treating such conditions as Neurasthenia, Debility, Anemia, Insomnia and many other like conditions.

For such cases as the various Neuralgias, Sciatica, Lumbago and Acute Inflammation, the Stabile, positive pole method is used, owing to the fact that a condition of "Anelectrotonus" is produced.

Knowing that the anelectrotonus produced in the region of the positive pole tends to reduce irritability, the same method will be found to be very valuable in treating such cases as Spasms, Tension Cramps, Spasmodic Torticollis and also Spastic Paralysis.

When we wish to improve metabolism and speed up the circulation, we would use the pole changing method, that is, run it a short time in the positive direction and then reverse it to run in the negative direction. This method will be found very valuable in the treatment of Frost-Bite, Chilblains, and such like conditions.

In cases where we wish to treat muscular atrophy conditions or paralysis, the interrupted galvanic current will be found very valuable. This can be done by using any method to interrupt the current, either by using a switch in the circuit or by connecting a metronome so as to give properly timed interruptions, or simply by applying and taking off the electrodes.

Of course, when applying the current in this manner, it is well to remember not to use too strong a current to produce undue irritation or pain to the patient.

Then again, the Galvanic current is used for the introduction of various drugs into the tissues by ionic medication or in other words, cataphoresis.

THE RESPIROIDAL CURRENT

By Mel R. Waggoner, M. D., Cedar Rapids, Iowa



Probably the greatest cause of failures in the use of electricity as a therapeutic agent, is the natural habit of applying it along some set rule, as prescribed in some text book, never exercising the brain in the attempt to figure out why it should or should not be used.

There is the natural tendency to place a cloak of mystery around electricity, and even more so around the human functions. And when we are applying something mysterious to cure something equally mysterious, then our results will be mysterious, i. e., we do not know why the case got well or why it did not. This is far from being scientific, because a science is always definite.

The human functions are simple combinations of simple actions. The single cell as we all know embodies the simplest of chemical and mechanical action. It is combinations of these actions which give us the complex organism.

If we will constantly exercise our faculties in the attempt to work out these various functions, the selection of treatment for disease will be greatly simplified, more accurate results will be obtained, and we will then be practicing a true science.

For example—let us consider normal tone of the pelvis abdomen and thoracic viscera. We all know there is such a thing, yet how many of us have stopped to figure it out? We are content to look upon it as some mysterious, unexplainable phenomenon, characteristic of animal life.

The truth is, it is the simplest of mechanical and chemical actions. It is the response of the individual cells collectively to a regulating irritation, given rise to by the organism itself in order to produce and maintain activity or life.

In order to understand the action of anything we must first be able to compare it with some known action. Visceral tone can be best explained by comparing it to the action of the cylinder, piston and electrical system of the

McINTOSH UNIVERSALMODE



Those who appreciate the superior features of the Universalmode, but do not care for the pump, vibrator or electric air heater, may secure the apparatus stripped of those features, as illustrated above, affording the following modalities:

- | | |
|--|--|
| 1. Rapid Sinusoidal, 1800 cycles per minute. | 6. Combined Galvanic and Sinusoidal. |
| 2. Interrupted Sinusoidal. | 7. Slow Surging Galvanic. |
| 3. Slow Sinusoidal, 10 to 170 cycles per minute. | 8. Galvanic. |
| 4. Surging Sinusoidal, 20 to 340 periods per minute. | 9. Interrupted Galvanic, 10 to 170 interruptions per minute. |
| 5. Superimposed Wave, 10 to 170 cycles per minute. | 10. Diagnostic Lamp. |
| | 11. Caution. |

The pump, vibrator, etc., can be purchased and attached later, if desired.

Prices

Fig.		Price	Code	Class
1000	Universalmode for 110 volts, direct current, without stand, as illustrated	\$435.00	Sabor	A
1001	Universalmode for 110 volts, 60 Cycle, alternating current, without stand, as illustrated	435.00	Scipio	A
1004	Mahogany finished metal stand, additional	40.00	Sad	A
	Other special voltages and cyclages quoted on application.			

We have already been told the chemical result obtained at both the positive and negative poles. Therefore, the "Active" electrode will be chosen according to the kind of drug to be used. The most common substances used in ionic medication are as follows:

When using the Negative Pole, various preparations of Iodin are used. Sodium Salicylate and Sodium Chloride (common salt).

When using the Positive Pole, substances are used such as Zinc, Copper Salts, Magnesium Salts, Lithium Salts, and drugs such as Quinin, Morphine, Aconite and Cocaine.

In instituting ionic medication, all the various precautions as outlined in our previous discussion, must be strictly observed.

We have already been told that when applying the Galvanic current, the pads should be thoroughly soaked. On the other hand, in ionic medication, the "Active" electrode is thoroughly soaked in a *hot* one percent solution of the drug to be used.

Also, it is necessary that fairly strong currents should be used, owing to the fact that we must have an adequate driving force behind the drug to be sure that it is properly sent into the tissues. It will thus be seen that the amount of the drug driven in is in direct proportion to the amount of current used behind it and also the length of time the current is flowing.

Remember that all the solutions you use must be hot. We have already been told that heat assists the patient's comfort, causing relaxation of the tissues, good conduction and thereby easy passage of the current.

In carrying out ionic medication with the Galvanic current, it is necessary that in the use of solid drugs, these must be dissolved in water in order to undergo dissociation into kations and anions.

The kations are the ions which appear at the negative pole and which are positive in character.

The anions are the ions that appear at the positive pole and are negative in character.

Having already discussed the "attraction" and "repellent" action of "like" and "unlike" bodies, we will thus understand that the kations travel with the stream of electricity, and the anions travel against the stream. Thus, if we wish to drive kations into the tissues, it must be done under the positive pole, which repels them, and if we wish to drive in anions, this will be done with the negative pole.

It is not necessary to use distilled water for dissolving the solid drugs, as ordinary tap water is sufficiently pure, notwithstanding the fact that this water contains various salts in solution, as these are harmless and somewhat similar to the salts contained in the human body.

To get the best therapeutic results, weak solutions are advisable, owing to the fact that dissociation occurs more freely in such solutions.

We have already been told that the Galvanic current produces no contractions on a normal muscle when flowing with uniform strength. On the other hand, if the current is suddenly stopped or cut off, a muscular contraction is produced. The same condition occurs if the current is also suddenly turned on.

It is well to note at this point that when the active electrode is the negative pole, the contractions are much greater than when using the positive pole. This point is very important when testing muscles for "reaction of degeneration."

The majority of normal muscles contract strongly with the negative pole when about three milliamperes of current is used. The type of contraction, during muscle testing should be closely observed. If the muscles are normal, the contracture is short, sharp and brisk; a quick response will be noted, followed by a quick relaxation.

The nutrition and tone of a muscle fibre is governed by nerve impulses originating in the motor nerve cells, situated in the anterior horns of the spinal cord, and if these impulses are cut off from the muscle either in injury or disease of the nerve or by a damaged condition of the anterior horn cell the muscle substance soon undergoes degeneration. This is shown by the extreme rapidity of manner in which it wastes. Its loss of normal tone is very evident—it hangs loosely and flabbily between its bony attachments. It is found to be cold, owing to the defective circulation through it. Latterly, paralysis is evident.

In this condition, the muscle gives an abnormal response to electrical stimulation. This response is called the "reaction of degeneration" (R. D.).

There are about three main points to note, in which a degenerated muscle varies in its response, from the normal muscle.

First, it gives absolutely no response to stimulation by Faradic current. This is because the Faradic current stimulates the muscle through the nerve and in such cases naturally the nerve has lost its conductivity.

Second, a muscle only responds to interrupted galvanism (these interruptions of the current when testing, should be at uniform intervals so as to get an absolutely correct reaction), by a slow, sluggish and long-continued contraction which passes off gradually; the opposite in a normal muscle being a brisk response. This is owing to the fact that the electric current stimulates the normal muscle through its nerve fibres. These fibres act as excellent conductors of the current, and, therefore the response is rapid.

When the muscle and nerve are degenerated the nerve does not conduct the electrical impulse. The Galvanic current affects the muscle directly, but the effect is slow, as the current is transmitted more sluggishly through the muscle tissue.

In testing muscles, the "motor point" of the muscle should be especially picked out and treated by the active electrode, so as to get the best contractions. We know that the "motor point" of the muscle is that point at which the nerve enters the muscle, and therefore, stimulation at this point results in the maximum contraction of the muscle. A correct diagnosis of the seat of a nerve lesion and the prognosis of the condition are, in many cases, aided by such knowledge of the muscle reactions.

This oftentimes takes up much time and results are often not of the best.

In order to perform the test, it is of the greatest importance that all of the affected part should be completely supported; there must not be the slightest drag on the muscles. The technique is as follows:

Have the indifferent electrode made of a large pliable pad, well moistened, and placed on the region of the spine which supplies the muscles to be tested.

The active electrode is of the small spongio-disc type and fastened to a handle with a make and break key. The active electrode is then placed on the motor point of the muscle and the current turned on to about three milliamperes.

The beginning of the test should be performed with the negative pole as the active electrode, the current turned on and immediately broken as required; at the same time carefully watching the muscle for any response that might take place. Gradually turn on the current until such is obtained.

A contraction of the muscle, as a rule, is well indicated by a slight tightening of the tendon, or twitching of the joint it works. At the first sign of a response, the strength of the current is to be observed and also recorded. The matter of recording the response will be obvious to you.

The second part of the test is then performed with the positive pole as the active electrode. The same procedure is followed in the matter of observation

VIBRATORY MASSAGE for spinal stimulation, inhibition or local effects is readily secured by fitting a massage cable to the attachment provided on shaft of motor.

NASAL DRILLING is afforded by attaching a suitable cable to shaft of motor.

SPRAYING of oils or liquids is accomplished by means of the powerful pump illustrated with the apparatus. This pump is capable of developing a pressure up to 50 lbs. This is more than ample for spraying, nebulizing or powder blowing, as 10 lbs. pressure is ample for such purposes. The degree of pressure may be instantly regulated by turning thumb screw. For massaging the tympanum, the length of stroke can be shortened by adjusting the position of the eccentric on the driving wheel. Deep suction up to 30 lbs., suitable for aspiratory purposes or for producing hyperemia according to Bier's method, is readily secured. The suction can be employed to operate the Pelvicmultimode, if desired.

ENDOSCOPIC LAMPS for diagnostic purposes may be illuminated under perfect control.

RESULTS AFFORDED BY UNIVERSALMODE

- | | |
|--|---|
| 1. Rapid Sinusoidal, 1800 cycles per minute. | 10. Diagnostic Lamp. |
| 2. Interrupted Sinusoidal. | 11. Cautery. |
| 3. Slow Sinusoidal, 10 to 170 cycles per minute. | 12. Mechanical vibratory massage. |
| 4. Surging Sinusoidal, 20 to 340 periods per minute. | 13. Electrically heated air. |
| 5. Superimposed Wave, 10 to 170 cycles per minute. | 14. Pneumo-massage of tympanum, eye or skin. |
| 6. Combined Galvanic and Sinusoidal. | 15. Spraying of liquids or powder blowing in nose or throat work. |
| 7. Slow Surging Galvanic. | 16. Vaporizing or nebulizing of oils. |
| 8. Galvanic. | 17. Deep suction suitable for aspirating in congested sinuses. |
| 9. Interrupted Galvanic, 10 to 170 interruptions per minute. | 18. Bier's hyperemia. |

The new model Universal mode offers all of the advantages of the Polysine Generator, affording exactly the same range of modalities with the addition of the tankless air pump for spraying, suction, pneumo-massage, Bier's hyperemia, etc., a mechanical vibratory massage handle, an electric air heater and a first-class Cautery transformer.

The motor and generator on the Universal mode have a greater capacity than the Polysine and, consequently afford a heavier Galvanic current. The apparatus is equipped with a larger type of milliammeter, with scale reading from zero to 400 on the black figures and a reading of zero to 20 on the red figures.

Prices

Fig.	Price	Code	Class
1000	Price for 110-volt, direct current, omitting stand, pump, vibrator and all accessories shown, but including cords, handles and spongio electrodes....	\$435.00	Saber A
1001	Price for 110-volt, 60-cycle, alternating current, same as above.....	435.00	Scipio A
1030	Same for 110-volt, 25-cycle, alternating current, same as above.....	460.00	Siler A
1002	Price for 220-volt, direct current, same as above.....	460.00	Scallop A
1003	Price for 220-volt, 60-cycle, alternating current, same as above.....	460.00	Scout A
1004	Price, mahogany finished metal stand, additional.....	40.00	Sad A
1006	Price, McIntosh Tankless Air Pump, latest model, complete.....	60.00	Sage A
1007	Price, McIntosh-Carpenter Vibrator Style "A" Hand Piece and Cable, including six Applicators.....	50.00	Saint C
1009	Price, McIntosh Pneumasseur, complete.....	10.00	Salary D
3201	Price, McIntosh Electric Air Heater, as shown.....	9.50	Sallow D
1010	Price, Cautery Cords, Handle and one electrode.....	6.00	Saline C
1011	Price, Spray Bottle Heater, including five Bottles.....	20.00	Salmon C
1012	Set of three Glass Cups for Bier's Hyperemia.....	2.50	Salute C
6215	Price, complete set six Kanthorn Asbestos Pad Electrodes.....	13.00	Electro C
6158	Price, Dr. Romer's Self-Retaining Spinal Electrode.....	7.50	Excess C
6005	Price, Therapist's Electrode Assortment.....	30.00	Elite C
1020	Price, Universal mode, complete with above accessories for 110-volt, 60-cycle, A. C.....	675.00	Saxon A
1035	Complete with above accessories for 110-volt, 25-cycle, A. C.....	700.00	Salvo A
1025	Price, Universal mode, complete with above accessories for 110-volt, D. C.....	675.00	Scott A

THE McINTOSH UNIVERSALMODE



Fig.		Price	Code	Class
1020	McIntosh Universalmode, complete with all accessories, as shown above, for 110 Volts, 60 Cycle, A. C.	\$675.00	Saxon	A
1025	McIntosh Universalmode, complete with all accessories, as shown above, for 110 Volts, D. C.	675.00	Scott	A

OUR DIAL CURRENT SELECTOR is the pre-eminent advantage of this apparatus. A single knob controls the selection of any one of the eleven distinctive effects secured—all plainly lettered on the dial.

THE SINUSOIDAL CURRENT in seven distinct varieties is one of the valuable features of the Universalmode. A new friction device controls the frequency of the slow sinusoidal by simply turning a knob.

THE GALVANIC CURRENT for electrolysis, cataphoresis, gynecology, etc., is generated in the apparatus, having no ground connection, and is perfectly controlled by the MacLagan wire rheostat and measured by accurate milliamperemeter.

INTERRUPTED GALVANISM for muscle and nerve testing reaction of degeneration is obtained by a mechanical rotary break from 10-170 periods per minute of much more uniform character than from a clockwork rheotome.

ELECTRO-CAUTERY points, loops and snares may be heated perfectly with complete

If the positive pole gives a response with less current than the negative pole, then "reaction of degeneration" can be diagnosed, providing of course, that the response to the Faradic current was lost and the sluggish contraction to the Galvanic current is obtained.

It, therefore, can be assumed that "reaction of degeneration" is likely to be present in those conditions where there is a marked damage of either the anterior horn cell or of the nerve trunk emanating from these cells; as we already know, this part of the nervous system is called the "lower motor neuron," in contradistinction to the upper motor neuron—that is the motor cell in the Rolandic area of the brain and the nerve fibre springing from it and passing down the cord as a pyramidal tract. Lesions, if long continued, of the lower motor neuron, result in reaction of degeneration. Lesions confined to the upper motor neuron do not show reaction of degeneration.

The commoner lesions of the lower motor neuron may be:

First, lesions of the anterior horn cells, such as anterior poliomyelitis (infantile paralysis) or progressive muscular atrophy.

Second, lesions of the nerve trunk, such as a section of the nerve trunk, either ulna or median paralysis from an injury, long continued pressure on a nerve trunk demonstrated by drop wrist from involvement of the musculospiral nerve in callus—severe cases of facial paralysis, from compression of the facial nerve in the stylo-mastoid foramen. Degeneration of the nerve trunk—long-continued peripheral neuritis, plumbic, arsenical, post-diphtheritic, alcoholic, etc.

Galvanism plays a very important part in the treatment of G. U. cases.

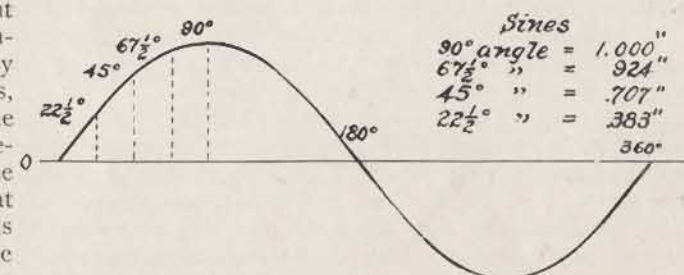
Where a dilating and relaxing condition is required, the negative pole is indicated. With positive galvanism, Menorrhagia and Metrorrhagia can be well treated, that is, when these conditions are not dependent upon a constricted uterine canal. Hemorrhoids, if not too indurated, can be treated with good success by positive galvanism.

To be successful in Electro-Therapeutic technique, it is necessary to keep the fact in mind to give current strength sufficient, and time sufficient, that is, take into proper consideration the size of your pads, their thickness and absorbent qualities so that their resistance will be lowered and thereby enable the operator to administer an adequate current.

SINUSOIDAL CURRENTS

It is rarely one will find a textbook on Electro-Therapeutics which gives a correct definition of the Sinusoidal Current. I am therefore giving it here with the feeling that it is important that the doctor be in possession of as correct information as possible on any fundamental principle of electricity, when using Electro-Therapy as an adjunct to his practice.

The Sinusoidal Current is a current which can be graphically represented by a sine curve, that is, a curve whose value at any instant is determined by the sine of the angle at that instant. A cycle is 360°. At 90° the value of the curve is



Note the gradual rise and fall of the sine wave, also note gradual change of

therefore see the term Sinusoidal used when referring to a current which starts at Zero, comes up to its full strength on the positive side and then drops back to Zero, forming what is called a sine wave.

The current then repeats the sine on the negative side and thereby completes a full sine. We therefore have produced an alternating current, positive and negative, and rhythmical in character.

This current is found to be very much less irritating and painful than the Faradic, owing to the fact that it is not "opened and closed" abruptly, and, in consequence, the Sinusoidal is now the current employed for general use in nerve and muscular stimulation.

Owing to the great rapidity of the sine wave in the Rapid Sinusoidal Current, no polarity effects are displayed and it is, therefore, rated as a mechanical current. The Rapid Sinusoidal is either used in its original state or can be controlled by being run through a Rotor, (a Rotor being a fixed resistance unit with moving brushes), which, by evenly raising and lowering the resistance, converts it into a surging wave.

The Surging Wave is much used and is extremely valuable in stimulating relaxed or atonic muscles, especially when massage of the deeper structures is required, such as abdominal adhesions.

The Slow Sinusoidal is produced in much the same manner as the Surging Sinusoidal. It is invaluable in building up muscular or secretory functions, as for instance, an atrophied muscle or diseased prostate with poor secretion. Therefore, the Slow Sinusoidal is considered for its mechanical tonic effects.

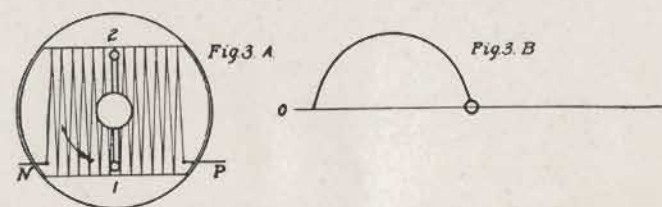
In using the Sinusoidal Currents, it is necessary to use caution, in so far as causing fatigue is concerned—the best results are obtained by giving small and frequent doses. It is a well-known fact that it is injurious to overwork even a healthy muscle. Therefore, it is a necessary precautionary measure to ascertain the condition of the muscles you wish to tone up and then give them just sufficient current to get desired results, and no more.

PHYSIOLOGICAL ACTION AND EFFECTS OF THE SINUSOIDAL CURRENT

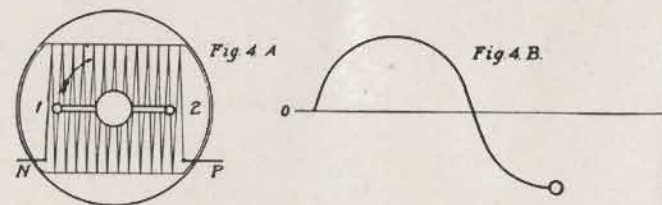
One of the most important physiological actions of the Sinusoidal current is in the relief of pain. It has great influence over nutrition and metabolism, favorably stimulating both, and exerting a marked influence upon the sympathetic nervous and muscular system. Its value is well demonstrated for either the excitation or sedation of contractional tissues, and owing to its penetration being great, it is especially useful when it is desired to influence the action of deep-seated organs. It has a soothing effect upon the areas where hyperesthesia is particularly noticeable. This current, owing to its massaging influence, increases the elimination of urea, sulphates and phosphates in the urine. Indican, if present, is at first increased, or if not found before, frequently appears after administering the current. After a number of treatments it is much less evident. As it is looked upon as a product of proteid putrification, it will therefore appear that the Sinusoidal Current tends to lessen toxic intestinal products through improved intra-abdominal circulation.

It is very often found to be most efficient for developing weakened muscles, and oftentimes it will provoke circular contractions in degenerate lesions when no response has been produced with Faradism. It is especially indicated in the treatment of spinal muscles, when their development and strength is desired. The best technique for this is to place the electrodes at corresponding points on each side of the spine, so that the muscles on one side will not exceed in development or strength, the muscles on the other side.

ONE-HALF OF FULL CYCLE. As the rotor arm continues to turn, the convolutions of wire are once more brought into circuit gradually, while the voltage begins to recede to the zero line, as shown in Fig. 3-B, until brush No. 2 reaches the upper position and brush No. 1 the lower place, as shown in Fig. 3-A; both brushes touching the neutral strand of wire with no current passing; at which position the neutral line in Fig. 3-B is again reached and the voltage is at zero. One-half of the cycle has now been completed.

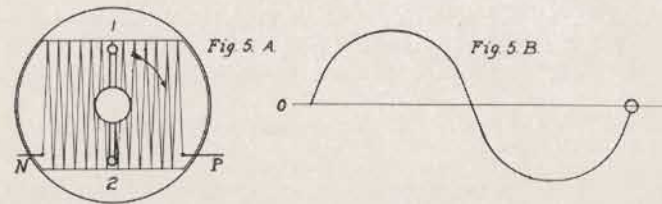


VOLTAGE OF REVERSE WAVE. The rotor arm continuing its revolution, brush No. 1 enters the negative side of the resistance unit and the voltage commences to increase in the opposite direction until the peak of the lower sine wave is reached, as shown in Fig. 4-B, at which point brush No. 2 is at the extreme right and brush No. 1 at the left, as shown in Fig. 4-A.



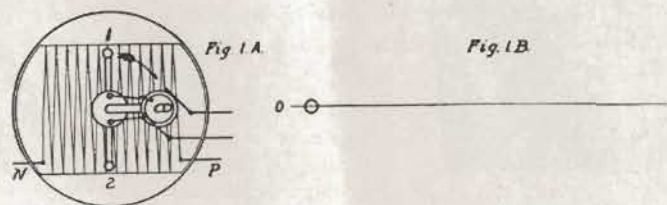
CYCLE COMPLETED. When the brushes complete their revolution and finally arrive at their original position, with brush No. 1 above and brush No. 2 below, as in Fig. 5-A, the entire cycle of one sine wave has been completed, as shown in Fig. 5-B.

SIMPLICITY OF CONSTRUCTION. The entire method of operation is so beautifully simple that it cannot but impress the physician as eminently more practical and serviceable than the long, awkward resistance drum used by others: which has sharp ridges of wire for contact space, whereby the friction is concentrated at the weakest point of the wire—where it bends sharply.

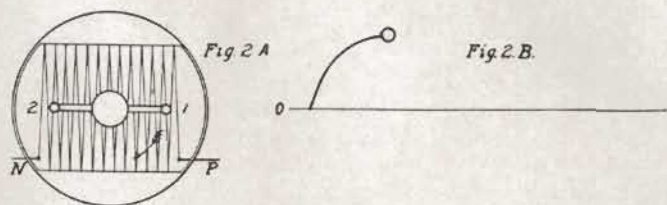


PRINCIPLE OF OPERATION OF ROTOR OR SLOW SINUSOIDAL MECHANISM OF THE McINTOSH POLYSINE GENERTOR AND UNIVERSALMODE

REQUIRES FEW REPLACEMENTS. The rotor mechanism consists of a porcelain base wound closely with high-grade resistance wire, against the surface of which revolve two carbon brushes attached to the rotor arms. On the rotor shaft is a pair of collecting rings connected with the brushes on rotor arms, while two additional brushes make contact with the rings. These four carbon brushes are the only parts of rotor needing replacement. The brushes attached to the rotor arm revolve against a smooth surface of wire resistance, producing practically no friction; as they travel in a circular path the graduations of resistance merge together perfectly in the form of a sine curve of geometrical exactness.



VOLTAGE AT ZERO. In Fig. 1-A we note the working parts of the rotor showing the resistance unit with convolutions of wire shown vertically, while the collecting rings on rotor shaft are shown at right. The rotor arm is shown with brushes resting on one convolution of wire, no current passing to the brushes at this point, hence, the cut at right, Fig. 1-B, shows the neutral line with no voltage.



FULL VOLTAGE ATTAINED. As the rotor arm begins to turn clockwise and the brushes leave the neutral strand of wire, the entire resistance of the rotor is in circuit with the patient; but as it continues to revolve, the strands of wire are cut out of circuit, one at a time; while the voltage gradually rises, as shown in Fig. 2-B, until brush No. 2 reaches a position at extreme left and brush No. 1 a place at the right, as in Fig. 2-A; at which point the resistance has all been eliminated from circuit and the voltage reaches the peak of the sine curve in Fig. 2-B, where the full voltage is being delivered to the brushes.

When instituting Sinusoidal treatment, the usual guide for dosage is the patient's toleration.

It will now be quite obvious to you that in the application of Electro-Therapy, making the proper determination as to what form of current to apply—and in the case of Galvanism, which pole to use, size and kind of pads, electrodes and correct technique—has a very important psychological effect upon the patient and insures the operator's success in his work.

It is not only necessary to use correct technique, but also to have in one's possession Electro-Therapy apparatus which is of the best and of the highest efficiency.

I have endeavored to lay a ground work in this discussion to enable you to use the electric current with definiteness and intelligence. Like all things in life, practice makes perfect. One cannot be expected to be master of technique immediately. I am, therefore, bringing before you technique as used by myself and also by such men as Neiswanger, Grover and other reputable authorities.

In citing these various techniques, it is not expected that you will take each or any as an absolute standard, but really as a guide to yourself and to put before you the various methods of technique used.

As you already know, each patient and condition which he brings before you, invariably presents a different and varied clinical condition and picture. Therefore, oftentimes you quite naturally will be called upon to use your own judgment and thus work out your own salvation in the application of Electro-Therapy whenever indicated.

In the foregoing, I have endeavored to impress you with the fact that electricity is invaluable as an adjunct in medical practice. It is now the chief working-tool of the neurologist, both in diagnosis and treatment. With the assistance of the electrical current, we frequently obtain a knowledge of the duration and curability of many diseases.

This is quite evident when we take into consideration that the correct determination of the responses of the muscles of a limb may either mean a diagnosis of several diseases or merely a trifling pressure paralysis of a part.

It has been found invaluable in medico-legal evidence, in determining the presence or absence of lesions due to accident, and also disclosing malingering.

In conclusion, I wish to point out the following for your guidance:

If you wish mechanical effects, remember that the Sinusoidal Current is mechanical in its action.

If you wish chemical effects, such as ionization, cataphoresis, electrolysis, etc., use the Galvanic Current, because it is chemical in its effect.

A FEW REMINDERS

SINUSOIDAL CURRENTS—are used for mechanical effects.

GALVANIC—used for polar or chemical effects.

RAPID SINUSOIDAL—should not be used too long owing to its tendency to fatigue muscles—short periods are, therefore, advised.

SLOW SINUSOIDAL—is indicated for muscle tonic effects—building up secretory functions and atrophied conditions.

INTERRUPTED RAPID SINUSOIDAL—is indicated for obtaining nerve tonic.

Sinusoidal currents are contra-indicated in acute and sub-acute inflammations.

Always treat inflammatory conditions first and follow with tonic treatment.

GALVANIC CURRENT—Use the alkaline or negative pole in the presence of acid conditions.

Use the acid or positive pole in the presence of alkaline conditions.

A FEW POINTS ABOUT ELECTRODES

Flexible sheet composition metal or block tin alloy, cut and molded to fit parts, may be used for Galvanic and Sinusoidal Currents, but is apt to produce a harsh, burning sensation, therefore, it is generally customary to cover the metal with some medium, capable of holding moisture and softening the effect of the current somewhat.

The old fashioned sponge or felt has many good points, although such electrodes become unsightly after a few applications. Layers of gauze or other material may be used under sheet metal.

Some operators are quite partial to chamois skin covers for the sheet metal, which has the property of holding the moisture for a long time. Chamois Skin can be kept on hand in a Dakin's solution, sterile, moist and ready for use. One advantage of the chamois skin is that it can be molded exactly to fit the part, thus making perfect contact, and the flexible block tin alloy can also be molded to fit closely to the chamois skin, and thus afford perfect conductivity.

Some authorities recommend the use of moistened clay. This has the advantage of being readily molded to fit the skin and it retains the moisture for a long period.

However, the great majority of Electro-Therapists, who do not have time to experiment with different forms of electrodes, prefer the Kanthorn Asbestos Pad Electrodes. These are constructed of several sheets of asbestos fibre cloth, covering a sheet of flexible wire gauze with a soft rubber insulated back and a pure linen covering over the asbestos. The asbestos has the property of retaining moisture for a long time, while the linen has the property of transmitting the moisture very evenly. The flexible gauze enables the electrode to be shaped to fit the part. These electrodes are neat in appearance and can be sterilized in Dakin's solution without injury, and for additional cleanliness, can be covered with a sheet of moistened gauze when in use.

PREPARATION OF PATIENT. In order to apply either Galvanic or Sinusoidal Current over the skin, it is necessary that the skin be rendered as clean and sterile as possible. Thorough preparation means satisfactory administration. You would not attempt a surgical operation without assuring yourself of absolutely sterile conditions. First, scrub the skin thoroughly with soap and water to remove all the oil on the surface; then, to make sure that no fatty particles will cause a concentration of current in spots and a consequent burning, wash the skin off either with ether or alcohol as a double precaution.

BURNING OF SKIN. In occasional instances where patients complain that the current causes a burning of the skin, it may be traced readily to one of the following causes: First, the skin has not been thoroughly cleansed and particles of fat or oil are causing the current to jump and burn in certain areas; Second, the electrode is not properly moistened and is only delivering current in spots, or perhaps during the treatment the moisture has been dissipated; Third, the electrode is not properly shaped or molded to fit the part, or is not making good contact with the skin, but is moving back and forth causing a make and break effect and causing a concentration of current in the area where good contact is made.

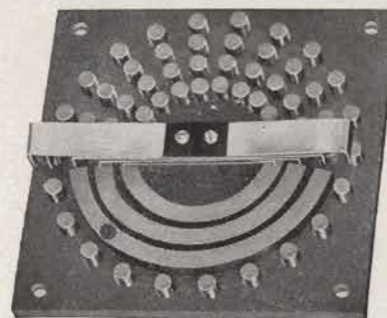
If the electrode is weighted down with a bag of sand or shot, it will prevent this occurrence.

Electrodes applied to extremities can be held in place with a bandage.

The Galvanic Current, owing to its polar properties, always causes a mild sensation of burning at the negative pole. The Slow Sinusoidal Current, which



In the accompanying cut is shown the dial current selector, a distinctive device found only on McIntosh apparatus, taking the place of complicated switches as used by other manufacturers. It will be noticed that there are no cams to change and no gears to shift, just merely turning the pointer to the modality desired. This greatly simplifies the operation of the apparatus and prevents errors in selection of current.



In this cut will be noted an illustration of the working portion of the dial selector which is contained underneath the base. By simply turning the knob on dial selector, the set of levers is revolved until it makes contact with the row of buttons, establishing a circuit for the desired modality.

The blades of the levers are so made that at all times a definite, clean contact is assured. It will be noted that this dial selector is of sturdy build. Strength of material has not been sacrificed in the concentration of modalities.

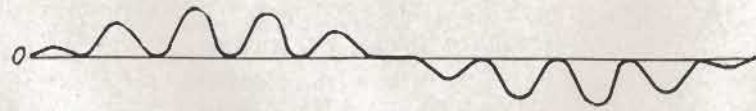
A separate cut of the MacLagan Wire Rheostat is herewith shown. All parts of McIntosh Polysines are standardized and made in large quantities, thus insuring a uniform product and greatly simplifying the matter of repairs or replacement, should such ever become necessary through injury or accidental damage. With ordinary use and proper care, the McIntosh Polysine is good for a life-time of service.



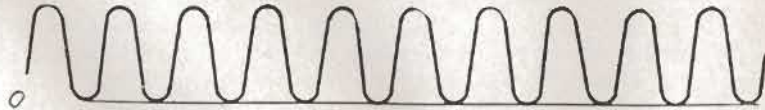
The predominating feature in this Rheostat is the fine wire resistance winding on flat porcelain base, thus enabling the operator to cut out a very small amount of resistance at a time and thereby assuring him of smooth control.



This cut portrays the pole changer. This pole changing switch is of great convenience to the operator when desiring change of polarity in using the Galvanic current. By merely turning the switch from Positive to Negative, or vice versa, much time is saved, owing to the fact that change of electrode is unnecessary.



5. *SUPER-IMPOSED WAVE* 10 to 170 Cycles per minute. This consists of the combined galvanic and sinusoidal currents, sent through the Rotor. It is tonic and stimulating in effect and is indicated as very advantageous when treating atonic conditions of the colon.

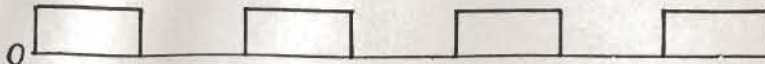


6. *COMBINED GALVANIC AND SINUSOIDAL* 1,800 Cycles per minute. Excellent results are obtained by this form of current as desirable metabolic effects are produced and at the same time, the tissues are thrown into a condition of increased electro-excitability, so that great results are obtained upon wasted muscles and degenerated nerves, by giving this form of current. It is indicated for weak and flabby muscles without reaction of degeneration. It will be found that degenerated muscles will respond more actively to labile galvanism after the application of ten or fifteen minutes of the combined galvanic and sinusoidal, than if the combined current had been omitted.



7. *SLOW SURGING GALVANIC* 20 to 300 Periods per minute. This current has practically the same sensations as the Slow Sinusoidal, except that it does not reverse polarity, but maintains its galvanic properties. It is very valuable in testing for muscle degeneration.

8. *GALVANIC* This current possesses all the characteristic effects as its name implies and is used in the treatment by electrolysis cataphoresis and is greatly used in gynecology, G. U., work, Rectal treatment, Facial Blemishes, Removal of Warts, etc. Splendid results are reported in the treatment of granulated eyelids, stenosis of the lachrymal duct, frontal sinusitis, etc.



9. *INTERRUPTED GALVANIC* 10 to 170 Periods per minute. A special commutator on the Rotor shaft affords current flow and current break for one-half the duration of each period, thus making a much more accurate interruption than the clockwork rheotomes used on Wall Plates for this purpose. This current being the last to be used in testing muscle degeneration, if the muscle fails to respond it means that the final diagnosis can be made.

10. *DIAGNOSTIC LAMP* This modality is very valuable in connecting any transilluminator, cystoscope, urethroscope, auriscope or any other diagnostic lamp. The lamp can be lighted to full brilliancy and controlled perfectly with rheostat.

is also Galvanic in character, has a slight tendency to burn; and these facts are true regardless of the make of apparatus, as they are the result of basic principles.

However, where a vigorous contraction is desired, in the case of a patient especially susceptible to burning, the operator will find that by using the Surging Sinusoidal Current, or the Super-Imposed Wave Current, it will be possible to get the maximum results with the minimum irritation.

THE SINUSOIDAL CURRENT AS AN AID IN TREATMENT OF NEURASTHENICS

With contributing causes, such as Intestinal Stasis, Splanchnic Insufficiency, Chronic Constipation, Visceroptosis, Enteroptosis, etc.

From a Physio-Therapeutic standpoint, very little has been written upon this subject, the main reason being no doubt to insufficient practical clinical data being tabulated. It is extremely unfortunate and yet true—and such statement the writer is quite willing to make without fear of contradiction—these cases are looked upon by a great majority of general practitioners, as unavoidable chronics; to be treated as one would a petulant child—to be given a few kind words, treated with an air of resigned tolerance, some advice extended as to improved mental and physical hygiene, a change of environment, incidentally handed out a prescription for some cathartic and then told to come back again at some remote date if not improved—at the same time hoping that the patient will take his pitiful tale of woe elsewhere.

The writer at one time—to his discredit—was no exception in such an attitude towards this class of case.

After five years' experience in the Canadian Medical Corps, both during and after the war and also extended experience in mental institutional work, such an attitude was absolutely reversed, owing to the fact that sufficient data proved to him the significance and necessity of adequately treating the many existing ills that this class of case suffers from, owing to their consequent debilitated nervous condition.

It was found that conditions such as intestinal stasis, chronic constipation, intestinal auto-intoxication, enteroptosis, visceroptosis, splanchnic neurasthenia and other like complaints actually existed, and were not features of the patient's so-called "imagination."

At the outset the writer wishes it to be thoroughly understood that the Physio-Therapy statements made by him are free from empirical structure—the results obtained have been too definite and beyond question. Then again, it is intended that Physio-Therapeutic methods of treatment are not put forth as a panacea or "cure-all" but to emphasize the efficiency and potency of their effectiveness and therefore a necessary adjuvant in carrying out successful treatment.

Subjective Symptoms

It might be well at this point to give a classical picture of the neurasthenic as he presents himself to the physician.

The patient approaches the doctor with an air of uncertainty. In most cases there are signs of emaciation. The step is either halting or jerky. The attitude may either be one of depression or imperative impulsiveness. Facial expression is generally one of undue irritableness or over-anxiety. Skin is pale and dry.

When asked the usual questions by the physician as to his condition, the patient immediately launches out into a long rambling discourse as to his complaints. These complaints are many and various.

The history is given of sleeplessness, erratic digestion, frequent eructations, flatulence, chronic constipation or its opposite, diarrhea, frequent headaches, abdominal pains, also pains in the back, inability to concentrate, a general feeling of lassitude and a pronounced exhaustion on making the slightest effort.

In fact, the patient's one object appears to be to impress the doctor that he is suffering from every complaint possible. As a matter of fact, there is neither beginning nor end to his complaints.

This is easily demonstrated by the easy agreement these patients show, on the slightest suggestion by the physician of any additional symptoms.

The pity of it is, these cases only come to the physician in a condition of chronicity, after having spent divers years and sums under the care of charlatans, various cults and quack medicines, in a futile attempt to alleviate their condition. Hence, the extreme difficulties the physician experiences in instituting definite curative treatments, which engenders the spirit of superficial physical examination.

It is not the intention of the writer to enter upon a discourse of general neurasthenia and the differentiation of the various psychosis associated thereto, as such comes under neurological discussions, the intention being to confine this writing to the neurasthenia due, directly or indirectly, to auto-intoxication and also to emphasize the fact that much valuable aid can be given to the neurasthenic whose condition has brought about splanchnic insufficiency and consequent visceral disorders, as already enumerated.

Objective Symptoms

On physical examination, we find weakened abdominal muscles, oftentimes diffusely sensitive on deep palpation, or the sensitive points may be localized, sometimes the pains radiating to the back, to the neck and legs. Such is found to be due to the congestion of the intra-abdominal veins irritating the terminal ramifications of the splanchnic areas. It is also found that there is a certain amount of pressure on the intestines, allowing their readier distention with gas, and consequent pressure effects on the abdominal wall.

This lack of intra-abdominal tone and pressure, naturally, interferes with the normal circulation of the splanchnic vessels, causing to a great extent marked venous congestion—in other words, the abdominal viscera becoming saturated, as it were, with stagnant blood, and therefore, resultant general toxins.

The effect of these toxins on the general metabolism is well known and, therefore, detail is unnecessary at this writing.

Then again, we have to deal with complications such as visceroptosis and enteroptosis, these two conditions being due to the weakened abdominal walls, constipation, prolonged nervous depression, etc. (Congenital weaknesses or deformities, we are not concerned with at this time.)

Treatment

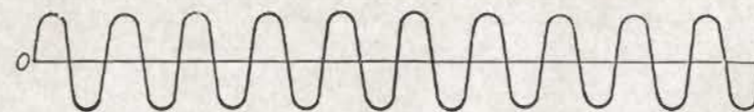
In the first place, owing to the fact that many of these cases, as already stated, come to the physician oftentimes too late for satisfactory treatment, it is therefore impossible to restore the exhausted capital. Drugs and tonics invariably are not of much avail, as results from their use are effected but temporarily.

The main point at issue is to remove the aggravating cause, i. e., the objective symptoms—the subjective symptoms thus taking care of themselves.

The physician, presuming that these cases respond in their symptomatic makeup, to intestinal auto-toxemia, resorts to the use of cathartics and intestinal antiseptics. Yet, when it is realized that cathartics induce, by their action, an increased blood supply to the abdominal viscera, it will be seen that they

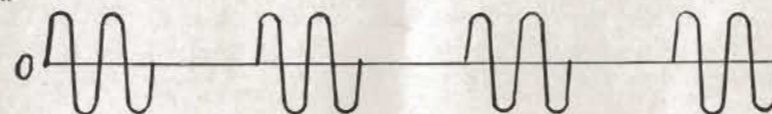
MODALITIES OF POLYSINE GENERATORS AND UNIVERSALMODES

Diagrammatic tracings follow, showing the modalities obtained from the No. 1058, No. 1068, No. 1078, No. 1088, No. 1055, No. 1065, Polysine Generators, and the Universalmodes.

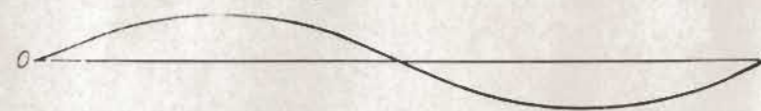


1. *RAPID SINUSOIDAL* 1,800 Cycles per minute. Note the rapid rise, fall and reversal of polarity, but which owing to the rapidity of change, gives no polarity effects. This current is used for stimulation when given in a mild form and is sedative when heavier applications are instituted. This current comes under the "mechanical current" section in Physio-Therapy. It is extremely valuable when used to improve tone and musculature by exercising, to aid in removing sequelae of fibrositis, and to improve local nutrition, when given in quantities below that necessary to promote contractions in contractional tissue.

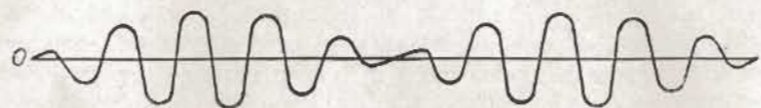
This current has now practically replaced the Faradic, owing to the fact that the Faradic current is tetanic in action, induces fatigue and painful sensation.



2. *INTERRUPTED SINUSOIDAL* 10 to 170 Periods per minute. Many authorities claim that in certain conditions in Pelvic disorders, this form of current is of great assistance. Many leading electro-therapists of today state that they find this current very valuable when using it to regenerate nerve functions. It has also been found of great use in the treatment of Infantile Paralysis.



3. *SLOW SINUSOIDAL* 10 to 170 Cycles per minute. This current is referred to by many authorities as the galvanic-sinusoidal mode, owing to the fact that it is galvanic in character, in that it has the power to stimulate the contractility of muscle apart from the nervous convection of stimuli, but without polarity effects. The slow, effortlike contractions with gradual undulations of the slow Sine Wave, are perfect imitations of the voluntary contractions that best develop muscles in size and strength. The fact that paralytic muscles respond earlier and better to slow impulses than to fast ones, makes this current invaluable for such treatment.



4. *SURGING SINUSOIDAL* 20 to 300 Cycles per minute. Compound Sine Wave combining the rapid and slow modes in one. It produces deep muscular contractions. It produces rhythmical contractions of the abdominal muscles and is indicated in the treatment of splanchnic neurasthenia, gastroptosis and enteroptosis.

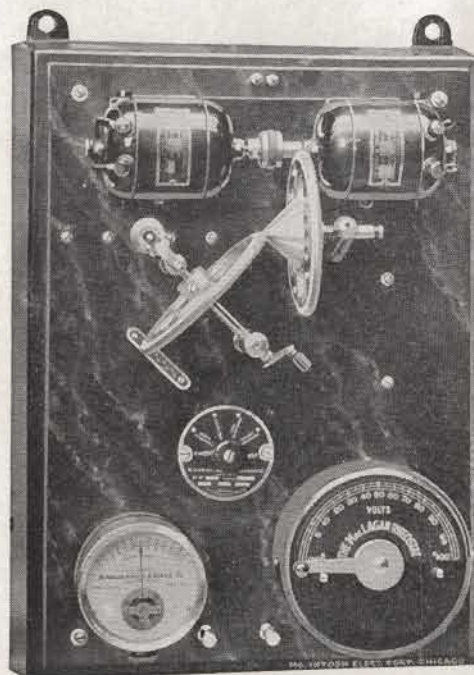
McINTOSH No. 1200 POLYSINE GENERATOR

For 110 Volts, 60 Cycles, A. C.

In order to supply the call for reliable Galvanic and Sinusoidal Apparatus at a low price, we have designed this simplified form of Polysine Generator.

It comprises the essential elements of the larger Polysines, including the same Rotor, and produces Sine Waves of equal geometrical exactness; also comprises the same Rheostat, meter and a simplified dial current selector.

By eliminating some of the additional Sine Waves and interrupted currents found on other Polysines, and by using a smaller motor and generator and omitting the cabinet work, it has been possible to produce this apparatus at a lower cost, without impairing the results in any way.



MODALITIES AFFORDED

1. Rapid Sinusoidal, 3,600 Cycles per minute
2. Galvanic.
3. Slow Sinusoidal, 10 to 170 Cycles per minute.
4. Surging Sinusoidal, 20 to 380 Cycles per minute.

All modalities are Earth Free and ungrounded and the patient cannot receive a shock by coming in contact with a damp floor, a radiator, water pipe or gas pipe, as the Galvanic and Slow Sinusoidal currents originate in the generator; while the Rapid Sinusoidal is taken through an earth free transformer underneath the base; and the Surging Sinusoidal consists of the Rapid Sinusoidal passed through the rotor; hence, no possibility of a ground.

Beautifully Finished. All of the parts and accessories are mounted upon a handsome marble-ized slate base measuring $13\frac{1}{2} \times 19$ inches, which is attached to a finely finished, mahogany enamel iron base 16 inches wide and 21 inches long, arranged to hang upon the wall or to lie on the table. The total depth of the apparatus is $10\frac{1}{2}$ inches over all and it weighs 62 lbs.

	Code	Class
Price for 110 Volts, 60 Cycles, A. C.	\$225.00	Sand A

Other special voltages and cyclages quoted upon application.

augment rather than clear up the symptoms dependent upon congestion of the intra-abdominal vessels.

The writer's experience in successful treatment is as follows:

Adequate rest is advised, special attention is paid to diet, in that, instead of patient being placed under restrictions, frequent feeding of small amounts is instituted, rather than regular meal hours. Very necessary proper occupational therapy is carried out, also graduated exercises. In conjunction with this, various forms of hydro-therapy are used, such as the "Scotch Douche," for toning up the abdominal musculature and nerve trunks, also "Needle Spray" is used as a nerve tonic.

During the war a very large number of these cases were treated with abdominal massage for the purpose of strengthening the abdominal muscles and toning up peristalsis. Good results were obtained from this treatment, but it was found to take up an extended length of time and had a somewhat negative effect upon the patient, owing to the vigorous treatment necessary.

In the matter of exercise, many difficulties were experienced owing to the fact, and which is well known from any observation of neurasthenics, that being as they are, introspective, suffering from lowered nervous vitality, the exercises were not carried out sufficiently by them to produce the desired results.

Therefore, the use of the Sinusoidal current was instituted. The question arises, "Why this form of electrical treatment?"

The Sinusoidal current acts differently upon the body from any other form of electrical energy. It possesses the property of contracting the organs, also the veins and stimulates the sympathetic abdominal nerve fibres. It is also capable of producing a powerful rhythmic contraction on muscle fibre or groups of muscles, without pain or discomfort to the patient. It is thus observed that its action is entirely mechanical.

Then again, it will now be obvious that this current is the logical medium to tone up the musculature, both abdominal and intestinal, and due to its action on the vessels, is invaluable in readjusting the circulatory condition and driving out the stagnant blood from these parts.

Chronic Constipation

For chronic constipation, without other complications, brilliant results are obtained with the Interrupted Rapid Sinusoidal current, owing to its tonic effect upon the intestinal musculature, commencing with 10-minute treatments for the first week, gradually increasing to 15 minutes, interruptions to be timed between 20 and 30 to the minute.

For the abdominal muscles, the Surging Sinusoidal is used, commencing with seven to 10-minute treatments the first week, and then gradually increasing to 15 minutes, the surges timed to occur 15 to 20 per minute. Treatment to be continued until definite results are effected, which is generally from three to six weeks.

In the above treatments, pads of about 4" x 6" are used, well saturated in a saline solution, one pad being applied in the sacral lumbar region and the other on the abdomen.

Splanchnic Insufficiency, Visceroptosis, Etc.

In the cases of splanchnic insufficiency, it is first necessary to relieve the visceroptosis. Surgical interference as a rule does more harm than good.

Advice in the matter of keeping up correct posture is given and exercise and fresh air, also the usual form of diet. Cathartics or purgatives of any kind are absolutely contra-indicated.

To drive the stagnant blood from the abdominal viscera and to establish a more normal splanchnic tone, the Surging Sinusoidal current is used, the technique being as follows: An absorbent pad of about 5" x 7", well saturated with a saline solution, is applied over the region between the inferior angles of the scapulae. Another pad of similar size and kind, is applied over the epigastric region and connected in the usual manner. The current is slowly turned on until vigorous muscular contractions are observed, at the same time taking care that current is not too strong for patient's comfort.

The current is timed for the surges to occur about 15 to 20 to the minute, first week of treatment to be of about 12 to 15 minutes duration and carried out daily, until results are noticeable, after which treatments are cut down to three times weekly, until patient's discharge.

Intestinal Stasis

The condition of intestinal stasis is one which is much more often met with than any other intestinal trouble. It is a condition which has been involved in more unnecessary and useless surgery than was warranted.

Then again, it is a condition which is often overlooked, owing to the fact that pronounced or painful symptoms are oftentimes not in evidence.

While this condition may be found in the region of the sigmoid, splanchnic and hepatic flexures, the region of the caecum is the one most common.

Intestinal stasis is primarily a mechanical condition and owing to the fact that peristalsis is greatly interfered with and consequent impaction of feces, dangerous conditions such as kinking of the bowel, are liable to take place.

This condition of intestinal stasis is not confined wholly to the typical neurasthenic, and the writer wishes to emphasize the fact that this condition exists in the average individual to a greater extent than is realized.

The present mode of living is a great contributing factor, especially in our large cities, the busy executive and business man, the sedentary worker, etc., being the chief victims.

Incorrect diet—and one has only to make observations of the modern lunch room to verify this, with its hurried service and oftentimes poorly cooked food—lack of exercise due to too much riding in automobiles, elevated trains, etc., the general nervous tension and not sufficient relaxation, in the hurry and bustle in bowing to the "Goddess of efficiency" are also obvious contributing factors.

It can be safely stated that if adequate prophylactic measures were carried out, the majority of these cases would never require surgical interference, and without doubt, many valuable lives would be prolonged. The far-reaching effects and consequent serious complications due to the absorption of toxins, are too well known to be dealt with in detail here.

The removal of the primary condition is the object in adequate treatment. This can only be effectively carried out by mechanical means, owing to the fact that the tonicity of both the abdominal and intestinal musculature require the necessary mechanical stimulation to restore them to normalcy. The Slow Sinusoidal, then, is therefore the only and best form of electrical current to use.

Practically the same technique is used in its application, as in the treatment of splanchnic insufficiency, with the exception that the abdominal pad is placed over the region of the sigmoid, splanchnic and hepatic flexures or the caecum, as the individual case indicates.

In conclusion, the writer wishes to point out that most of these cases, when treated with the Sinusoidal current, show splendid improvement.

McINTOSH POLYSINE GENERATORS For Direct Current

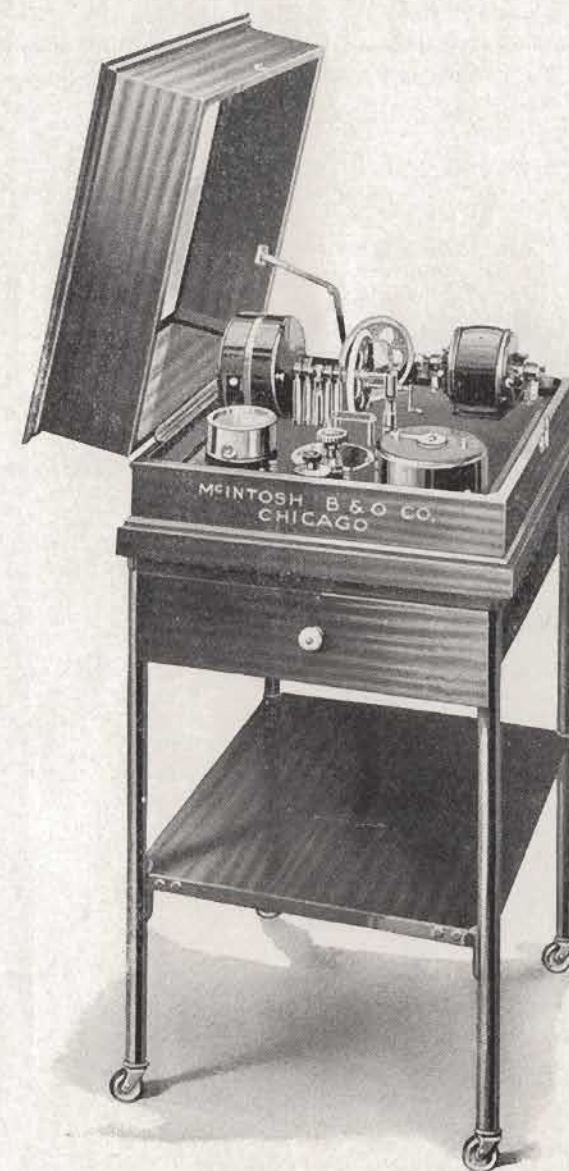


Fig. 1055 for Direct Current

Fig.		Price	Code	Class
1055	McIntosh Polysine Generator, for 110 Volts, D. C., omitting Stand.....	\$325.00	Speed	A
1065	McIntosh Polysine Generator, for 220 Volts, D. C., omitting Stand.....	350.00	Steak	A
1015	Mahogany Finished Metal Stand for Apparatus as shown in illustration, additional	35.00	Sole	A
1016	Mahogany Wall Bracket to hang cabinet on wall, including screws and hangers, additional	5.00	Snap	A

Other special voltages and cyclages quoted on application.

McINTOSH POLYSINE GENERATORS For Direct Current

The new model Polysine Generator, as illustrated, for operation on direct current, affords the same range of modalities as the alternating-current Polysine; but differs in two exceptions.

First—it is built and intended for operation on direct current *only* and, therefore, cannot be operated on the alternating current.

Second—the motor generator on this apparatus is not double wound. Consequently, all modalities delivered are grounded; although for direct application to the patient these modalities are just as effective and just as safe as from an ungrounded apparatus, the only difference being that it is not adapted to hydrotherapy. When the patient is placed on an ordinary operating, treatment table or chair, free from contact with the earth, the application of the current from this apparatus is entirely satisfactory and differs in nowise from similar treatment with any other make of Sinusoidal apparatus.

Ten (10) Modalities Afforded by either A. C. or D. C. Polysines are as follows:

- 1—Rapid Sinusoidal, 1800 cycles per minute.
- 2—Interrupted Rapid Sinusoidal, 10 to 170 periods per minute.
- 3—Slow Sinusoidal, 10 to 170 cycles per minute.
- 4—Surging Sinusoidal, 20 to 380 cycles per minute.
- 5—Superimposed Wave, 10 to 170 cycles per minute.
- 6—Combined Galvanic and Sinusoidal, 1800 cycles per minute.
- 7—Slow Surging Galvanic, 20 to 380 periods per minute.
- 8—Galvanic.
- 9—Interrupted Galvanic, 10 to 170 periods per minute.
- 10—Diagnostic Lamp.

For descriptive details and diagrammatic drawings of the various modalities, turn to page 41.

Dimensions for A. C. or D. C. Polysines

Outside dimensions, 21x22x11 inches. Height of apparatus on stand to top of cabinet when opened, 57 inches. Height of stand to top of cabinet when closed, 41 inches. Approximate shipping weight, machine only, 180 lbs. Machine with stand, 220 lbs.

This treatment is not confined solely to the neurasthenic whose nervous debility is due directly to auto-intoxication resulting from splanchnic troubles, as already outlined, but is an invaluable aid in the treatment of those unfortunate cases due to psychopathic heredity, epileptics, hysterics, etc., who are sufferers from the various intestinal disorders.

THE USE OF THE GALVANIC AND SINUSOIDAL CURRENTS IN THE TREATMENT OF FOOT TROUBLES

It is worthy of note, that of very recent years more attention has been paid by the Medical Profession to the care of the human foot.

Charles Cross, M. D., of San Francisco, California, has performed much valuable pioneer work along these lines, especially in the treatment of restricted action and adhesions of the ankle, tarsal and meta-tarsal bones and phalanges, also callous formations, such as the discrete, mass, inflamed and ulcerated. For the above he is obtaining good results by the use of the Galvanic current.

With the Sinusoidal current, he reports good results in the treatment of pressure pains, broken arches, flat foot, weak foot and turning ankles.

In the course of a paper written by him and appearing in the American Journal of Clinical Medicine, June 1922, he is quoted as follows:

"In the non-surgical orthopedic methods of treatment to relieve or prevent foot ailments, the scientific application of electricity, as a physio-therapy accessory, has a place of great importance. In fact, it has a place of so much greater importance than has ever been given to it that this short paper is submitted for publication with the hope of stimulating a further study of the various methods to treat and prevent foot ailments.

It is only since the World War that Feet have almost insidiously crept in on the attention of the medical profession to claim even a slight degree of scientific consideration. It appears to be the habit of many colleagues never to go below the knee for diagnosis. As a pioneer in the study of this terra incognita, for many years before the World War, and as a teacher of medical and other officers during the war, and to medical graduates since returning to civilian status, I believe that the feet are so very necessary, that we should, in the future, devote to them far more scientific attention than in the past.

Preventable and efficiency-reducing foot ailments are now attracting more attention than ever before; therefore, this short paper. Much more might be added, as the entire subject is not covered, but if those who try to prevent foot ailments will learn to apply the modalities suggested, and get the results desired, they may be stimulated to tell in short papers some improvements that their experience suggests, and also what can be done without metal plates.

AILING FEET NEGLECTED BY PHYSICIANS

The subject of the scientific treatment of ailing feet, and the pioneer efforts to prevent foot ailments, need no apology. It is a subject not taught in medical colleges, and medical literature has little that is practicable to say about it. Almost every medical graduate has in his own family ample clinical material upon which to begin his studies. Even if he does not intend to treat feet in practice or to become a non-surgical orthopedic specialist, at least a speaking acquaintance should be cultivated with such an important part of the body.

* * * * *

In conclusion, let it be remembered that in the treatment of ailing feet, the rebuilding of broken arches, and in the application of prophylactic measures to prevent foot ailments in children the application of electricity must be agreeable

and comfortable to the patient. In fact, all treatments of the feet to patients of all ages must be comfortable and agreeable, otherwise more harm than good may result.

* * * * *

Most of the foot ailments which have their beginning in childhood can, and should, be prevented. Therefore, the prevention of foot ailments is a prophylactic service which should interest every physician and parent, and the scientific application of electricity is a most valuable physio-therapeutic accessory to treatment.

SOME METHODS OF TECHNIQUE AS USED IN THE ELECTRICAL TREATMENT OF FEET

Adhesions—Cross

To soften and hasten absorption of plastic exudate and permit breaking up of adhesions. Replacement of displaced or distorted osseous structure. Use Galvanic current, positive electrode to sacrum. Negative electrode applied over area of adhesions for 15 to 20 minutes, five times weekly and then as often as indicated.

Relief from Pain and to Prevent Pain—Cross

Rapid Sinusoidal current is used. One electrode to sacrum, other one applied over the entire painful area, 15 to 20 minutes, as often as indicated.

Flat Foot—Grover

This condition is often benefited by stimulation of the tibiales anticus, with one electrode to the inner side of the knee, the other to the inner side of the foot. Rapid Sinusoidal current is used.

Fallen Arches

Place in two enameled pans two pieces of tin connected to the Slow Sinusoidal current. Place over this a towel and fill with water to just cover the top of the toes, placing a foot in each of the pans. Turn on a sufficiently strong slow sinusoidal current until a decided contraction is produced. This will markedly strengthen the foot and relieve the tired condition. Treat for five minutes, and then bandage if a fallen arch. The figure 8 adhesive is recommended. Begin to apply it at the middle of the outer margin of the plantar surface of the foot, draw it straight across the sole, over the arch and around the ankle. This helps to hold the arch up.

GENERAL TECHNIQUE

Amenorrhea—Galvanic—Neiswanger

Negative galvanism is a vaso-motor dilator, bringing increased blood supply to the parts. Vaginal electrode covered with wet cotton pad is used in vault of vagina with positive pad on abdomen. Use 40 M. A., ten minutes every second day. The results in one month will restore normal condition.

Catarrh, Cervical—Galvanic—Neiswanger

This disease is more amenable to treatment and results more permanent than curettement. Large copper electrode to positive pole that will fill the cervical canal. Introduce electrode up to internal os and employ current of 30 to 40 M. A. Do not move electrode to prevent sticking, for that is what we want. Negative to large pad on abdomen. In five minutes the mucous plug will have adhered to electrode and by a little traction, may be withdrawn. Slight bleeding is of no consequence.

McINTOSH POLYSINE GENERATORS For Alternating Current



Fig. 1058
For 110V 60 C. A. C.

Fig.		Price	Code	Class
1058	McIntosh Polysine Generator for 110 Volts, 60 Cycle, A. C., omitting Stand	\$400.00	Song	A
1068	Same as above, for 110 Volts, 25 Cycle, A. C., omitting Stand	425.00	Sooth	A
1078	Same as above, for 220 Volts, 60 Cycle, A. C., omitting Stand	425.00	Solar	A
1088	Same as above, for 110 Volts, 50 Cycle, A. C., omitting Stand	425.00	Sound	A
1015	Mahogany Finished Metal Stand for Apparatus as shown in illustration, additional	35.00	Sole	A
1016	Mahogany Wall Bracket to hang cabinet on wall, including screws and hangers, additional	5.00	Snap	A

Other special voltages and cycles quoted on application.

McINTOSH POLYSINE GENERATORS For Alternating Current

The new model Polysine Generator, as shown in illustration, is built and intended for operation on the alternating current. This has been accomplished by including a sturdy generator which is directly connected to, but insulated from the motor by strong leather universal joint. This gives it a superiority over any other Galvanic and Sinusoidal apparatus obtainable at anywhere near the price. Furthermore, it is

COMPLETE IN ONE UNIT

No separate generating sets, no cams or loose parts to handle, mislay or take care of. This alternating-current Polysine is "EARTH FREE," that is, owing to the fact that it generates its own current; there is no chance for the apparatus to be grounded and thus, is the ideal apparatus for use in offices or hospitals where metal tables, tile floors and other electric conductors to the ground, are in use; and can, therefore, be used in connection with baths, massages, etc., as it eliminates all danger of accidental shock to either patient or operator.

Utility—

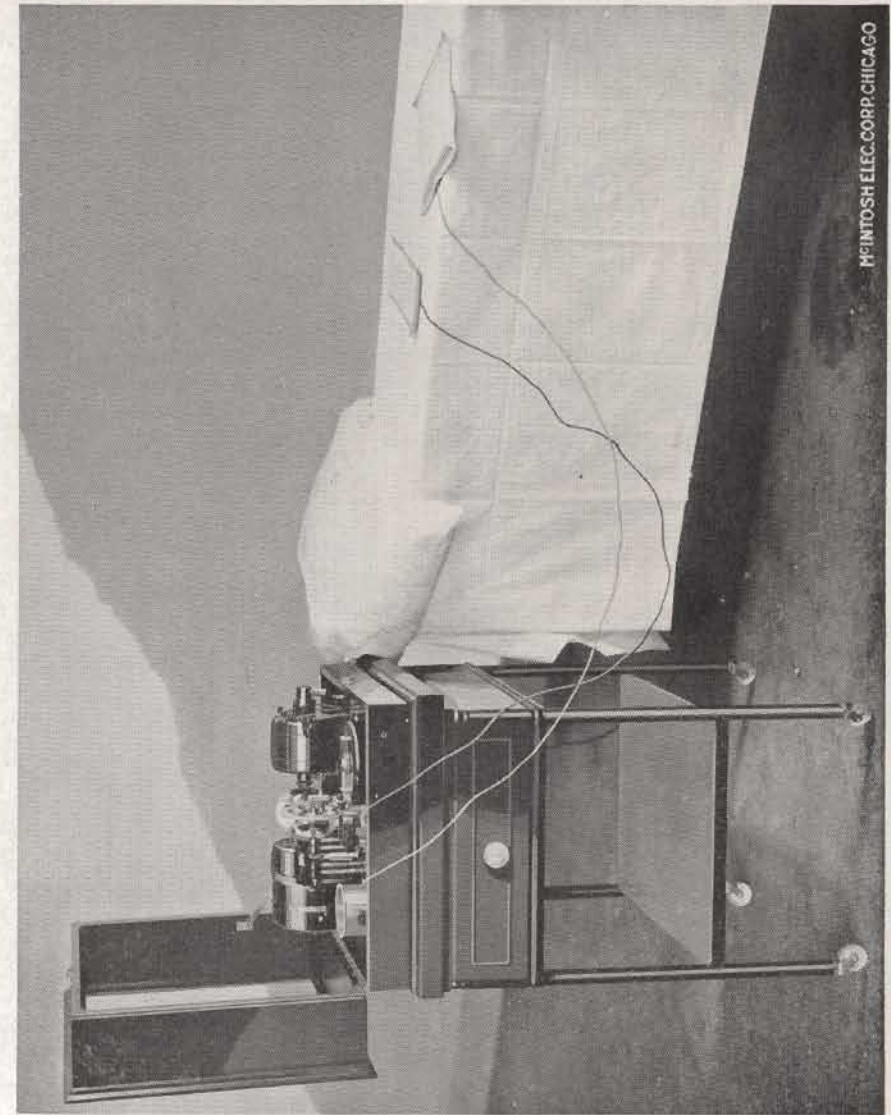
The New Model Polysine Generator affords the smoothest Galvanic current obtainable mechanically, due to our special condensers. The Slow Sinusoidal and all of the Wave Currents are of the most practical character and of sufficient volume for all therapeutic purposes with a liberal reserve. Every modality has its particular advantages; there is nothing superfluous. The characteristics of each modality are briefly outlined on page 41.

Simplicity—

Every modality is obtainable by simply turning the indicator of the Dial Current Selector to the modality desired as indicated on Dial. The frequency of the Waves and interruptions as well as the strength of the current may be regulated conveniently without stopping the treatment and both periodicity and voltage of currents is plainly indicated at all times during a treatment.

Refinement—

The New Model Polysine Generator has many new features which are time savers and the highest standards of mechanical construction and artistic finish have been carried out. All parts are designed and finished with a view to carrying out the touch of refinement in keeping with the modern physician's office. All of the mechanical parts are highly finished in black Japan and nickel and are mounted on a beautiful dark marble-ized slate base, enclosed in an artistic cabinet of solid Mahogany, in an exclusive dark brown Mahogany tone. The substantial tubular metal stand finished to match cabinet, contributes to the pleasing appearance of this apparatus.



McINTOSH ELECT. CORP. CHICAGO

Correct Preparation for Treatment is Necessary

The accompanying photograph depicts the method of preparation of apparatus and pads when giving Sinusoidal treatments in cases of Chronic Constipation, Splanchmic Insufficiency, Aortic Conditions of the Intestinal Musculature, Intestinal Stasis, Prosis, etc.

It will be noted that the pad on the left is smaller than the one at the right. The smaller pad is placed in readiness so that when the patient is lying on the treatment table, the pad will come in contact with patient's back in the sacro-lumbar region, except in the case of Splanchnic Insufficiency, when this pad is placed in the region between the border of the scapulae. The larger pad is ready to place on the abdomen of the patient in the area desired. (See chapter on technique for detailed methods.)

Chronic Constipation

In cases of Chronic Constipation, especially in males who are engaged in sedentary occupations, exceptionally good results are obtained as a curative measure, with the Sinusoidal current.

I use both the interrupted slow and surging Sinusoidal, owing to the fact that in 99% of these cases, the abdominal muscles, as well as the intestinal musculature, are in an atonic condition. Therefore, it is necessary to tone up and strengthen the abdominal wall, thereby restoring adequate blood supply, preventing a chronic condition of visceroptosis and also assisting the skin to perform its function as an excretia medium and thus taking some load off the overworked kidneys.

In the interim, the intestines have, as it were, to be re-educated, the musculature strengthened and peristalsis toned up to normalcy again. During treatment I stop all catharsis, but instruct the patient, (if office patient,) to take an enema once a week for three weeks. For best results treatment should be given daily and at regular hours, preferably in the morning. This will be obvious. Technique is as follows:

For Abdominal Muscles

A good, absorbent pad about 5" x 8", is placed in the lumbar region. Another pad, 6" x 8", is placed over the abdomen.

Turn on surging sinusoidal slowly and increase dosage to patient's comfort. (The average patient takes comfortably about 70 volts). Give from seven to ten-minute treatments for first week and then gradually increase time to fifteen minutes. Have sines timed to occur fifteen to twenty per minute.

For Intestinal Musculature

Proceed as for abdominal muscles, except that the interrupted sinusoidal current is used. Commence with ten-minute treatments for first week and gradually increase to fifteen minutes. Time the interruptions to run between twenty and thirty to the minute.

These cases generally give good response to treatment and curative effects are obtained in about six weeks. The last two weeks' treatment should not be oftener than three times weekly.

Dyspepsia—Tousey

Apply two well-moistened pads, 6x4 inches, to either side of the umbilicus. Turn on rapid Sinusoidal Current to comfort of patient and apply for 15 to 20 minutes, when indicated.

Dysmenorrhea—Neiswanger

Infantile uterus is one of the great causes of Dysmenorrhea and sterility as well, and the more we look for it, the oftener we find it.

For the treatment of these cases we require both Galvanism and Sinusoidal. A small metal olive—about No. 10 French—mounted upon an insulated staff, is attached to the negative pole of the Galvanic battery, the positive being a large pad, well wetted and placed upon the abdomen. A vaginal speculum is now introduced and when the external os is well exposed the olive-pointed electrode is introduced into the edge of the canal—it will not enter it—and the current gradually turned on by the aid of the rheostat until from five to seven milliamperes are reached. Just enough pressure should be used to keep the electrode firmly in contact with the mucus membrane. Hydrogen froth will be seen coming out around the edge of the olive, the alkaline action of the negative pole

McINTOSH PHYSICAL THERAPY APPARATUS

The Development of over FORTY YEARS

ABSOLUTE SATISFACTION ASSURED

The development of the McIntosh Electrical Corporation to its present place of leadership in the Electro-Therapy field, has not been produced in any mere manner of mushroom growth.

The firm was established in February, 1879, as the McIntosh Battery & Optical Company, Dr. McIntosh, who was the founder, being imbued with the idea of providing the Medical Profession with apparatus that would represent the latest scientific development and the highest possible quality.

This ideal has been adhered to and has been the watchword of the firm through all the years of its growth. It has been largely responsible for its success and present high standing.

The highest tribute we can render to the service is that a McIntosh customer is a McIntosh friend. These friends now number legion in the Profession and are located not only in every State in the Union, but in many foreign countries. Our best sales force is found to be the good word of our physician customer.

The apparatus which has been most closely identified with the progress shown by the McIntosh Electrical Corporation, is the McIntosh Polysine Generator, which has been conceded by the majority of Electro-Therapists to be the most practical and efficient low-tension current generator of its kind in the world.

Not only is it the choice of leading practitioners, but during the late war it was adopted by the Medical Corps of the U. S. Army as the standard for the reconstruction service in military hospitals. Hundreds of these machines were placed in U. S. Army hospitals and a great number were purchased by the Canadian Government.

Wherever Physical Therapy is used by physicians of experience and discrimination, the McIntosh Polysine Generator is always in demand as the most exact and dependable apparatus for the application of all low-tension electrical modalities.

WHY THE POLYSINE EXCELLS

1. Strongest Slow Sinusoidal of any apparatus on the market.
2. Most simple in operation. Dial Selector eliminates confusing switches.
3. Safest in use. All currents are "earth free," no danger of shock or "ground."
4. Most symmetrical Sine Wave of any yet produced. Oscillograph tracings corroborate claim.
5. Most practical Frequency Regulation afforded by friction gear instead of slowing down motor to an excessive degree.
6. Most compact, measuring only 21x22½x11 inches.
7. New Frequency Indicator. Shows the frequency of the slow Sinusoidal current.
8. Quiet running Induction Motor, no noisy mechanism.
9. Two entirely new and distinct modalities added to new model.
10. Lowest in price. You save the extra cost of a motor generator on A. C.
11. Highest quality of finish throughout, including a solid Mahogany cabinet.

Hay Fever

Application of the current to the seventh cervical spine will relieve the most positive symptoms of hay fever. This application stimulates the vagus, contracts the nasal mucosa and imparts increased tone to the heart.

Hepatic Congestion

A contraction of the liver may be obtained with one electrode at first to third lumbar and a pad at the sacrum.

Hiccough, Persistent

The condition can be instantly relieved by applying both small spongio-disc electrodes at the fourth cervical vertebrae, one on either side, and applying the current for about a minute at a moderate strength. This produces a stimulation of the phrenic nerve and contracts the diaphragm.

Lumbago

Renal disorders are sometimes confused with lumbar myalgia. In the former the onset of pain will be noticed upon palpation of the kidney. In the latter, bending far forward suddenly will stretch the muscles and elicit pain. If the erector spinae are involved the pain will be most noticeable when the spine is straightened. To treat these muscles apply both small discs at the sixth to eighth dorsal vertebrae, moving them along together over the area until about 15 minutes have elapsed in all. If the flexors (quadratus and psoas) are involved, bending forward is painful and rotation of the thigh (psoas) causes distress. To treat these apply both discs at the ninth and tenth dorsal.

Menorrhagia

By applying a strong sinusoidal current at the second lumbar, contractions of the uterus are obtained which have proven most valuable in relieving this condition.

Pertussis

One electrode at seventh cervical, pad at sacrum. This will stop the paroxysm if applied at the onset.

Prostatic Hypertrophy

The prostate can be contracted by applying the current to the twelfth dorsal, with a pad at the sacrum. This application makes a very agreeable form of massage and is very effective in reducing the size of the gland.

Subinvolution of Uterus

One electrode at first to third lumbar, pad at sacrum. This produces a powerful contraction of the uterus which may be noted with the aid of a speculum.

causes the tissue to become soft and slippery, the instrument goes slowly forward until it passes the internal os and is in the fundus.

We have now enlarged the uterine canal a little and although the action of the negative pole is stimulating, it is not sufficiently so to increase muscular cell growth, so we leave the electrode in place, turn off the galvanic and switch on the slow sinusoidal current for purposes of massage.

This current not only conduces to increase the muscular fiber of the uterus and its attachments, but stimulates the absorbents to take up the products of decomposition set free by the first application.

If the apparatus happens to give only one rate of interruptions—the rapid—good massage can be had by cutting the current up into periods.

At the second treatment, which should be in about three days, we employ the same sound, introduce it without the aid of galvanism and use only the sinusoidal massage.

For the third sitting the sound is increased in size by one number, introduced by the aid of the negative pole of the galvanic as in the first seance and followed by sinusoidal massage.

As it is much easier to increase the lumen of the canal than the muscular fiber of the organ, we should only continue the increase in the size of the sound up to a certain point, when we can omit the galvanism and use only massage.

It is hardly necessary to state that these treatments should be given with due antiseptic precautions, because it is a well known fact that neither negative galvanism nor sinusoidalism is germicidal. An antiseptic vaginal douche before coming to the office, mopping off the os with an antiseptic solution and seeing that the electrode is clean, are necessary precautions.

In many cases the author has developed a uterus $1\frac{1}{2}$ inches in depth up to $2\frac{1}{2}$ inches in eighteen or twenty treatments by the technique herein described.

Endometritis—Galvanism—Rice

Select a copper sound, amalgamate by dipping it in a 10% Sulphuric Acid solution, followed by metallic mercury. Bring it to a smooth, silvery appearance by necessary polishing. This process of amalgamating should be repeated before each treatment.

This electrode should have a metal surface exposed of at least $2\frac{1}{2}$ inches.

Place the patient in the dorsal position. Place well-soaked pad connected to the negative pole of the Galvanic current, upon the lower part of the abdominal region. Through a speculum, introduce the electrode, which is connected to the positive pole.

Turn on current slowly, using 20 to 50 M. A., according to size of electrode, severity of the case and the tolerance of the patient. After two or three mild treatments with 20 to 25 M. A., for five minutes, congestion and nerve irritability will be sufficiently relieved so that a strong current can be tolerated more easily than the mild one was in the beginning.

Ear Diseases—Tousey

The negative electrode is an olive electrode with flexible insulated stem; it is passed through an Eustachian catheter into the middle ear. The positive electrode is applied at any indifferent place, such as the hand. A current of from 2 to 6 M. A., is applied for five or ten minutes. It should be turned on and off gradually. Tubotympanitis at all stages and hyperplastic otitis, deafness, and roaring in the ears are greatly benefited. The treatment has some effect upon the auditory nerve and the cerebral centers. The occurrence of too much vertigo would be an indication for caution as to the strength of current.

Leighton Kesteven finds that ionic medication in ear diseases causes especially a sclerolytic effect. "Lay the patient's head sideways on table; fill the external auditory meatus with a solution of zinc iodid. Pass the current by means of a wire insulated to its tip which is wrapped in absorbent cotton; apply 3 or 4 M. A., with occasional change in direction, five or ten minutes in acute cases or twenty minutes in chronic cases of otitis media. Acute pain is relieved in a few minutes. Functional deafness of nervous exhaustion responds to two or three treatments plus a little Faradism." Acute mastoiditis vanishes if treated early. The electrode is wet with 1/100 mercuric iodid, 5 M. A., are applied over the mastoid process for one-half to one and one-half hours morning and evening. In purulent otorrhea zinc iodid ionization lessens the leukocytes and lymphocytes. Alum (2 per cent) is used for ionization in relaxation of the tympanum. Arsenic ionization is beneficial for tuberculous middle-ear trouble. For aural vertigo due to labyrinthine loss of couple, iodine ionizations are used, the positive pad being behind the mastoid, 5 M. A., is applied for a half-hour every other day for one or two weeks.

For pain in the mastoid, cocain or morphin ionization is used. A case of goiter which refuses X-Ray or radium may be treated by an aluminum anode 6x1 1/4 inches, four thicknesses of lint, 5 per cent zinc iodid, 15 M. A., for one hour. For ionization of the Eustachian tube use a catheter closed at the end but with lateral perforations for the last 1/4 inch. The external end is joined to a fine tube holding potassium iodid solution with a fine wire, carrying 3 M. A., current; five-minute seances being suitable for tinnitus.

Eyelids, Granulated—Waggoner

By means of the positive pole of the galvanic current and copper cathodes, these cases will clear up in three or four treatments.

Technique: Connect the positive pole to one of the small sized uterine electrodes of Neiswanger, the negative to a three by five pad, placed on any indifferent point, as chest for instance. Evert the eyelid and taking the electrode like a pencil, start gently rubbing it over the granular membrane. Have your assistant gradually turn the current on until about one milliamperes registers. This will usually be sufficient for the average case. Continue the treatments until the granules are coated a greenish grey. Repeat the treatment in four or five days.

Gastritis—Slow Sinusoidal

One pad over the fifth dorsal and the other over the stomach, fifteen minutes every day. Fifth dorsal empties the stomach by dilating pylorus.

Hemorrhoids—Neiswanger

Place the patient upon the table in Sim's position, wet thoroughly a pad as large as the hand, or larger, attach it to the negative terminal of the battery and place upon the abdomen. The positive is connected with the rectal electrode, which is then carefully introduced with the curved side down, pushing up with the electrode any fringe or prolapsed membrane. The current is now turned on by means of the rheostat until twenty milliamperes is reached, and allowed to flow for ten minutes. In most cases the treatment may be repeated every second day. The process here given is not intended to apply to old, hard, external hemorrhoids.

Lachrymal Duct, Stenosis of, (Weeping Eye)—Waggoner

Procure a set of Bowman's dilators, or any other that you wish to use. The negative pole of the galvanic current is, as we all know, a softener of tissue.

The object of using the Sinusoidal current in spinal reflex work is to impart a stimulus to the particular nerve involved to excite it to perform its functions. The following is a fairly correct technique for this purpose:

Apply a suitable pad attached to the indifferent electrode, to the sacrum. The active electrode is attached to a moderately small spongio-disc, using a handle that has an interrupter switch on it.

To elicit reflexes turn on a moderate current and apply the active electrode to the spinous process or directly over the foramen. Run the current for one-half minute. Then break circuit with interrupter and rest one-half minute. Repeat this procedure for about five minutes.

In cases where distinctly bi-lateral effect is desired, such as contracting the lungs or the abdominal muscles, it is advisable to use two spongio-disc electrodes, one over the foramen at each side of the spinous process. I will here give a few examples as to what can be accomplished.

Anaemia

For increasing red blood corpuscles by dilating the vessels and thus producing hyperaemia for anaemia, place indifferent pad at the sacrum and the active electrode at the tenth dorsal. This is excellent treatment for cases of anaemia.

Angina Pectoris with Dilatation

In Angina Pectoris with dilatation, place the indifferent pad at the sacrum and the active electrode at seventh cervical. This treatment invariably relieves the angina.

Asthma, Bronchial

In cases where the longitudinal muscles are relaxed and emphysema is present, the current can be applied at the fourth cervical vertebrae, with one small disc at each side, applying a fairly strong current, thus contracting the longitudinal muscles and expelling the air from the lungs. Apply the current for one-half minute and allow an equal period for rest and repeat this for five minutes.

Backache, Due To Kidney Distention

Place the indifferent electrode pad at sacrum and the active electrode at twelfth dorsal. This produces a contraction of the kidneys and relieves the pain. It is indicated in Parenchymatous Nephritis. It intensifies pain if Renal Calculus is present. Therefore, is invaluable in making a positive diagnosis.

Constipation, Atonic

This condition can be greatly benefited by applying both electrodes at the second lumbar spine, thereby producing a contraction of the intestines, stimulating peristalsis and adding greatly to the tonicity of the musculature. To vary this procedure, one pad may be placed on either side of the abdomen.

Constipation, Spastic

One electrode at eleventh dorsal, pad at sacrum. See Reflex Technique. This application dilates the intestines. This treatment is also indicated in Nervous Diarrhea, Peristaltic Unrest, Enteralgia.

Enteroptosis

Both electrodes at seventh and eighth dorsal, producing a powerful contraction of the abdominal muscles. Treatments, five minutes daily. By means of this treatment the abdominal muscles may be systematically built up and hardened as by no other method.

electrode. The lint should not be removed after the operation but may be left as a dressing, merely covering it with dry cotton and a loose gauze bandage. If done thoroughly, one application may be sufficient to start a healing process.

THE USE OF SPINAL REFLEXES

Much credit is due to Charles L. Ireland, M. D., for his enlightening work in spinal reflexes. It is a subject which deserves far more attention from the Medical Profession today than it has received in the past, owing to the fact that definite proof has been given of the wonderful results that have been obtained.

Quite naturally, these results can only be obtained in using spinal reflexes when the work is well understood and the technique carried out correctly.

Dr. Ireland has produced a chart showing the vertebral reflexes which may be elicited with the sinusoidal current. For some length of time mechanical percussion was advocated to elicit these reflexes, but time, improved technique and experience, have shown that the rapid sinusoidal current is the best medium, owing to its smoothness and non-irritating qualities, its capacity to contract involuntary musculature and its consequent ability to evoke reflexes.

We know, from our knowledge of anatomy and physiology, that from certain intervertebral foramina emanate nerves that control the contractions of the various organs and blood vessels. Then again, on the other hand, other intervertebral foramina have nerves emanating therefrom that dilate these same organs.

We also know that an organ is supplied with nerves that stimulate its secretory functions. If such as I have cited are taken into consideration, it is not surprising to realize that with the aid of the rapid sinusoidal current, we have a means at hand to obtain splendid results through the spinal reflexes in the treatment of diseased conditions of the various bodily organs and tissues.

Practically every viscus of the body can be made to contract or dilate by application of appropriate stimuli to definite vertebral regions.

It is a clinical fact that in most cases of disease, the presence of pain is a factor and assists in making a diagnosis. At the same time, a definite diagnosis cannot always be made as to exact location of the diseased organ, owing to the fact that we have to deal often times with "referred pain." This is just where the use of the spinal reflexes is valuable in making a definite diagnosis as to the specific organ involved.

Experience has taught us that when pressure is brought to bear upon the root of the nerve supplying a diseased organ, pain is always elicited. Take for instance a condition such as Appendicitis. In many of these cases, on palpation, you will elicit pain all over the region of the abdomen. Thus, oftentimes you are at a loss as to whether it might not be a case of gall stones, renal calculi, acute nephritis, salpingitis, etc.

You desire to be definite in your findings. Therefore, make good pressure over the region of the exit of the second lumbar vertebrae on the right side and your patient complains of pain. Thus, you can be assured that the trouble is in the appendix, because the second lumbar on the right supplies the appendicular region of the gut.

I wish to state at this point, for your guidance, that you must be quite sure that you are using your current or pressure at the exact point on the vertebrae. Otherwise, you will not obtain the desired result.

In using the spinal reflexes in combating disease, I advise the use of Dr. Ireland's chart as a guide to the exact nerve centers which you desire to work upon. (See Page 54.)



M^oINTOSH ELEC. CORR. CHICAGO

Relaxation of Areas Under Treatment Is Essential

This photograph shows the position of patient and pads, when instituting Sinusoidal current treatments, in cases of Chronic Constipation, Atonic Conditions of the Intestinal Musculature, Stasis, etc. Note the fully relaxed condition of the patient.

One pad has been placed in the sacro-lumbar region of patient's back and on which patient is lying, thus assuring a good contact with pad. Note the sand bag over pad on abdomen. This sand bag being of just sufficient weight to keep pad in good contact with patient.

In urethral stricture it has been proven of inestimable value. There is no reason why it is not just as valuable elsewhere, where we have to deal with scar formation and stricture.

Technique: Connect the negative pole to the smallest Bowman dilator that will engage the stricture. Connect the positive pole to one of the ordinary spongio-discs. Place the disc on your cheek and the dilator on your tongue and turn on the current until you can definitely feel it on your tongue, but not strong enough to burn. This will be a very small amount of current, barely deflecting the needle of the milliamperemeter, but not enough to register. Then turn off the current at the switch, leaving the rheostat handle where it was, i. e., at the point to deliver the right amount of current.

Now place spongio-disc on patient's cheek, gently insert dilator in punctum of eye and press it gently in horizontally until you strike the lachrymal bone. Then gently withdraw it slightly and turn it down and slightly inward. When the stricture is encountered, make very gentle pressure against it and turn on

the current. In a few minutes it will slip gently through. Repeat the treatment in three days. Usually four or five treatments is all that is required, to open them up. In case you find it difficult to enter the punctum, nick it slightly with a fine pointed knife. Each time you give a treatment, select a dilator one size larger.

Lumbago—Surging or Slow Sinusoidal

One pad on cervical spine, the other on sacrum. Give fifteen to twenty minutes treatment every day of surging or slow sinusoidal, to relieve pain.

Mammary Glands, Insufficiency of—Rapid Sinusoidal—Ireland

One pad between third and fourth dorsal vertebrae and other over glands. Treatments five to ten minutes daily until normal secretions are obtained. Cases have been reported where nourishment was impossible, in which an abundant secretion of milk followed in two or three days. It is a well-known fact that one of the principal causes of infant mortality in America is the almost universal habit of artificial nursing.

Muscles, Treatment of, with Reaction of Degeneration (R.D.)—Magill

It is commonly said that it is useless to apply faradism in these cases, as no response is to be obtained. This is disputed by Lewis Jones, who recommended the use of the induction coil for the most markedly degenerated muscles.

Interrupted galvanism is the more usual method of treatment, as by its use good contractions can generally be obtained. Thus, the muscles will be exercised and their circulation and nutrition increased.

Nerve Injuries—Grover

Electric response following nerve injuries is very important from the standpoint of prognosis. Conductivity is conclusive evidence of physiological continuity of nerve fibres.

An immediate improvement in the conductive excitability after neurolysis, suggests some degree of nerve block, but indicates a future recovery. Notwithstanding the loss of conductive response after neurolysis which indicates a severe nerve injury, it does not signify complete severance of nerve, nor preclude recovery.

The first indication of nerve recovery is a change from a slow to a quick response to the Galvanic current. This occurs some time before voluntary motion or response to the Faradic current, and indicates some degree of recovery has already taken place. The change from slow to quick response may be entirely overlooked unless eagerly sought for.

Neurasthenia, Splanchnic

Sinusoidal, slow or rapid, both electrodes. Eighth dorsal 20 minutes once or twice a day.

Neurosis, in the Woman, Due to Disease—White

(A) Surging Sinusoidal. Pad electrode at sacrum, another pad in cervical region.

(B) Positive Galvanic. Copper ball electrode in vagina, negative to large pad on abdomen.

No. 6095 Neiswanger's Perforated Copper Ball Electrode for Galvanic Current. May be used as an irrigating electrode—

Beginning treatment with (a) for tonic effect for 10 minutes, change to (b) for 5 minutes for the local antiseptic effect of the copper salt. Treatments

insert it well up in the middle meatus. Connect to the positive pole of the galvanic current, the negative being attached to a three by five pad on the chest, and give three milliamperes of current for five minutes. Then remove and have the patient take a deep breath, close the other nostril and forcibly breathe through the affected side. The vaso-constrictor action of the positive pole and adrenaline usually opens the duct and the suction caused by the rush of air usually produces a discharge of the sinus, followed by gratifying relief.

Stomach Troubles—Tousey

An electrode may be applied over each pneumogastric nerve at the base of the neck, and a Galvanic current of five or ten M. A., is applied for five minutes, with occasional reversals. This will cause the disappearance of nausea, vomiting and regurgitation in cases of Dyspepsia, with symptoms suggestive of Cancer.

Strictures, Small, Treatment of—Hirsch

Pass several whalebone filiforms and by careful and patient manipulation of these, get one of the filiforms to pass the stricture. Thread this filiform through the eye of an Otis Urethrotome and pass the Urethrotome using the filiform as a guide. After the stricture is passed, open the blades by twisting the wheel slowly. Do a small amount of dilatation about once every five days.

Removal of the scar tissue or the softening of it, can be best accomplished with negative galvanism. Put a large, water-soaked pad on the patient's abdomen and attach it to the Positive Pole of the Galvanic Current. Pass a urethral electrode through the stricture and apply one-half to one M. A., for five minutes, and withdraw the electrode. The time of treatment may be increased. Increase the current but little, depending upon the density of the stricture. Do not attempt to dissolve the scar tissue in one treatment, but use time and discretion. Let good judgment always be the guide.

Stricture, Urethral—Neiswanger

The technique is simple and may be briefly given as follows: The caliber of the stricture is taken in the usual manner with any set of urethral sounds, then an olive pointed electrode about two sizes larger than the caliber of the stricture, is attached to the negative pole of a galvanic current, and introduced into the urethra so as to engage the stricture. The positive pole may be a pad the size of the hand or larger on some indifferent point. The current is now turned on until five milliamperes is reached. No appreciable pressure is used, but the electrode is allowed, by its own weight, to slowly pass through the stricture, which it will do in about five minutes. The current is then turned off, the electrode withdrawn and the operation not repeated sooner than five to seven days, at which time a sound two sizes larger is employed.

Ulcers, Indolent Ulcers, Varicose Ulcers—Neiswanger

The treatment of indolent, sloughing or varicose ulcers by cupric cataphoresis, probably shows the curative value of the remedy to the fullest extent. The physician who is only a tyro in the use of electricity will be surprised how soon healthy granulations will start up in the old sore. The operation may be made painless by the application of a 4 per cent solution cocaine. After cleansing the ulcer with an antiseptic solution, take a thin sheet of absorbent lint the size of the sore, and having wet it with a normal salt solution, lay it upon the ulcer and apply a thin copper electrode, attached to the positive pole over the surface of the lint until it has become almost dry. The current strength in this instance may be governed by the sensation of the patient and the size of the

M^CINTOSH ELEC. CORP. CHICAGO

Proper Size and Kind of Electrodes is Essential

This photograph illustrates the method of administering the Rapid Sinusoidal current in cases of nervous debility.

It will be noted that the "indifferent" electrode is comprised of a medium-sized, well moistened pad, placed over the sacral region and held in position by a sand bag of just sufficient weight to assure of keeping pad in good contact with patient.

The "active" electrode is of the small spongio-disc type. Just sufficient current for patient's comfort is used and a stroking motion up and down the spine is carried out, taking care that electrode is kept in continuous contact during treatment. Duration of treatment, about 15 minutes.

This form of treatment will be found to be very valuable in treating the tired business man, the busy executive working at high pressure, and the nervous woman.

Note the fully relaxed position of patient and which is essential to obtain the best therapeutic results.

the negative being a pad the size of the palm of the hand placed on the back of the neck. From three to five milliamperes may be used for five minutes. If both sides are to be treated, do not use a double nasal electrode, but treat each side separately. The seances may be repeated thrice weekly.

In this treatment we utilize the polar effects of the positive pole, the copper salt and the suprarenal extract, and those who are not acquainted with the process, will be surprised at the rapidity with which results are obtained.

Sinusitis, Frontal—Waggoner

These cases usually suffer untold agony. There is one diagnostic sign, and that is—pressure with the finger on the floor of the sinus, just over the eyeball, produces considerable pain.

The cause of the pain is usually due to obstruction of the infundibulum or duct, draining the sinus which opens in the middle meatus of the nose.

First, we must open this duct and institute drainage. To do this, cover the terminal of your cord with cotton soaked in a weak adrenalin solution and

every day for first week, every other day during second week, afterward twice weekly.

Optic Nerve, Atrophy of—Grover

If seen early, much may be done by pneumo-massage for three minutes followed by negative galvanism, for 10 minutes over the eyelids. A mild current of 2 to 4 milliamperes is sufficient and should be applied every day for two weeks then every second day for a period of three months.

Otitis Media—Grover

Otitis Media is an inflammation of the middle ear and caused by infection. It may occur with or without fever; with or without ear-ache.

The medical treatment is about as follows: If the ear drum seems but slightly red, the nose is bombarded with a mixture of menthol, camphor and petrolatum or a solution of argyrol with the idea of contracting the mucous membrane about the eustachian tube, thereby promoting drainage. In case the drum is red to its entire extent, or bulging, or there is tenderness over the mastoid, the drum is punctured that drainage may be promoted.

M^CINTOSH ELEC. CORP. CHICAGO

Correct Technique—To Obtain True Therapeutic Results

The above is photograph of patient being treated with the Sinusoidal or Galvanic current for peripheral nerve injuries. Note the position of electrodes.

The electrodes are of the spongio-disc type and small enough so as to treat one nerve trunk at a time. Only a very small amount of current is used when beginning these treatments, so as not to tire out the injured nerve.

Current strength is only increased as nerves show good reactions, denoting increased tonus.

The physiotherapist treats these cases early by radiant light and heat which prevents extension to the mastoid.

In cases of suppuration of the middle ear with an opening through the drum without infection of the mastoid, zinc ionization is the ideal treatment. If the zinc solution reaches all suppurating surfaces, one treatment will stop the suppurating process.

An electrode for this purpose may be constructed easily from a horn or hard rubber ear speculum, a coil of wire and a pledget of cotton, (Ear Ionization Electrode No. 7). Wrap a small coil of wire with cotton, allowing a sufficient amount of the cotton to protrude through the speculum so as to reach the ear drum; place the cotton-covered wire within the speculum and place the speculum in the ear with protruding twist of cotton touching the drum. Attach the wire of the speculum to the positive pole of a direct current; fill the speculum with warm isotonic zinc solution and keep it full during the treatment, with the patient on his side and the indifferent or negative electrode on his side underneath. Allow a current of 5 to 8 milliamperes to flow for seven to ten minutes.

Ovarian Neuralgia—Slow Sinusoidal

One electrode on tenth dorsal, the other over ovary, fifteen to twenty minutes every day.

Paralysis—Slow Sinusoidal

Double electrode: For arms, third to seventh dorsal. For limbs tenth to twelfth dorsal. In some cases the surging sinusoidal current is recommended, being interrupted.

Peripheral Nerve Paralysis—Neiswanger

Our main dependence in a peripheral paralysis is exercise and massage, to supply nutrition and prevent further atrophy of the muscle, this we will accomplish with faradism. But if, as often happens, the muscle has so far lost its nutrition that it will not respond to the faradic current and therefore cannot be exercised in that way, we must have recourse to the interrupted galvanic current, because it is a well-established fact in electro-diagnosis, that long after a muscle has lost its faradic irritability and will not respond to that current, it retains its irritability to the interrupted galvanic and may be exercised by it. Just as soon, however, as the muscle regains its response to faradism, that current must be employed, and we will then know exactly how far we have advanced toward a successful termination of the case. So, while faradism is diagnostic, galvanism is prognostic.

Pleurisy—Rapid Sinusoidal

In pleurisy or intercostal pain of the chest wall, use one electrode over the eighth dorsal spine and one over the seat of pain with stable application for ten minutes. Very efficient in relief of pain.

Pregnancy, Vomiting In—Neiswanger

When we come to consider that this distressing accompaniment of pregnancy is due to an irritable condition of the pneumogastric, caused by reflex action, we can then realize that the usual remedies, such as ingluvin, cerium oxalate, bismuth, pepsin, hot water, etc., are utterly powerless to relieve the trouble.

While the application of high frequency currents to the neck and over the epigastrium has proven palliative, the author has had most excellent results by employing galvanization of the pneumogastric. Two ordinary sponge discs are attached to the double end of a bifurcated cord, each of which is placed over

the nerve in a sub-aural position. The single end of the cord is now attached to the positive pole of a galvanic circuit, the negative being the usual abdominal pad.

A current strength of from ten to fifteen milliamperes is maintained for ten minutes, and in obstinate cases, may be repeated twice daily.

The object being to produce sedation of the pneumogastric, a very rapidly interrupted current has been employed by some operators, but while relief is more quickly obtained by this method, the results are not so lasting as those produced by positive galvanism, and, besides, if the induced current used is not very rapidly interrupted, injury to the foetus may result.

Pre-Menstrual Psychological Manifestations in Young Girls—Rapid or Surging Sinusoidal

One pad over cervical region, other at sacrum. Treatments 20 minutes every day. The action of the surging sinusoidal is particularly soothing in all conditions bordering upon hysteria and it makes an admirable measure in these cases.

Pruritus—Grover

Pruritus ani is usually permanently relieved by ionization of iodine or zinc.

Form an electrode of a piece of zinc or block tin about $2\frac{1}{2}$ inches in diameter in such a manner as to fit between the nates and place on a thick pad of felt or gauze which is well wetted with an isotonic solution of zinc sulphate, place the pad in position and connect the electrode with the positive pole of a galvanic battery. The negative which should consist of a large, well moistened pad, can be placed under the patient's buttock as he lies in the Sim's position and connected to the opposite pole of the battery. Turn on the current gradually until a comfortable warmth is felt by the patient and continue the treatment for twenty minutes. This may be repeated at two or three day intervals until cured. From 2 to 5 treatments are usually sufficient. During the treatment no ointments are to be used. The parts must be kept clean by a washing with soap and water after every evacuation. In case there is great thickening of the membrane and it does not yield promptly to the zinc ionization, the treatment should be changed to Lugol's solution, but remember when using iodine in this manner it must be placed on the negative pole, otherwise, the technique is the same.

Raynaud's Disease—Tousey

Treatment by Galvanic current—this is often successful and consists in daily applications of one-half hour's duration, and with a current of 10 to 20 M. A.

The positive electrode is placed at the nucha and the limbs affected by the local asphyxia, are placed in a negative bath.

Rhinitis, Hypertrophic—Neiswanger

The negative pole of the galvanic current acts as an alkaline caustic, softening and disintegrating tissue, while the positive decreases the blood supply and shrinks or hardens tissue. It is evident, then, that every true hypertrophy calls for the application of the positive pole.

The writer's technique for the treatment of these cases is as follows:

A copper wire is twisted upon itself and the double end fastened into a connector, for the reception of the cord tip. About three inches of the distal end is loosely wound with absorbent cotton, which is well wet with adrenaline chlor. After cleansing the nasal canal with a douche, the electrode as prepared, is attached to the positive pole, and introduced well back into the nasal cavity,